TRIPURA UNIVERSITY

Department of Geography and Disaster Management

M.Sc. in Geography and Disaster Management

Programme Specific Outcome

At the end of the Programme student-

- Acquire knowledge in quantitative techniques and Cartography.
- Expertise to analyse Remote Sensing data (Satellite images) and GIS mapping.
- Expertise in small research project, field survey, and report writing etc.
- Acquire the knowledge on physical, human and applied fields of geography.
- Prepare for facing competitive exams like UPSC, TPSC, TET, SSC, PGT, TGT, etc.

SEMESTER I- 21Credits (Core Course (C): 13 Credits; Foundation Course (F): 4 Credits, Elective (E): 4 Credit)

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 701C	Geomorphology	4			4	100
At the end of the course student- • Acquire knowledge on the relationship between geomorphic processes and resultant landforms on the earth's surface. • Could explain the mechanism of plate movement and related tectonic activities. • Could assess the denudation processes and relate them in the real field. • Well versed with evolutionary concepts of various landforms from different climatic regions.						
Course Code	**Name of the Course**	**Credit Distribution**			**Total Credit**	**Marks (Scaled)**
		L	**T**	**P**		
GEDM 702C	Population & Settlement Geography	4			4	100
At the end of the course student- • will be able to learn about population data sources • have an idea about the population composition of the world and India. • Understand the trends and patterns of the components of population change in India and the world. • Learn the concepts of the population theories and the population policies and link with population characteristics. • Get an idea about the settlement system both for rural and urban regions. • Understand the spatial distribution of rural settlements and can recognize their shape, size and patterns. • Can correlate environmental impact on house types in different parts of India • Can identify different urbanized regions, can categorize settlement hierarchy and size-class distribution of towns.						

- Acquire knowledge about knew internal structure of towns and various models of development of urban areas.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 703C	Statistical Techniques and Cartography (Practical)			5	5	100

At the end of the course student-

- Are able to apply various statistical and cartographic techniques to deal with the available data in resolving geographical issues.
- Can understand the techniques of sampling.
- Knew how to correlate two or more variables.
- Acquire knowledge about spatial measurements of network analysis.
- Gets knowledge how to solve geographical data matrix.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 704E	Agricultural Geography	4			4	100

At the end of the course student-

- will be able to understand about the determinants of agricultural land use.
- Have an idea on the concepts, trends and patterns of land holdings
- Will know about the agricultural regions in the world and in India.
- Will have knowledge about different models in agricultural geography.
- Will know about different agricultural revolution and use of technology in agriculture.
- Will know about the importance of sustainable agriculture.
- Will learn about the agricultural developments and regional imbalances in India and the agricultural problems in India.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 705E	Regional Geography of India	4			4	100

At the end of the course student-

- To get Knowledge of regions and regionalization of India with changing time scale.
- To understand the regional issues, conflicts and regional disparities.
- To comprehend the concept of Regional Cooperation.
- To get the Policy Framework in Regional Development.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 706E	Environment & Ecosystem	4			4	100

At the end of the course student-

- Students will be able to recognize the physical and socio-cultural components of environment.
- Students will learn the various approaches of studying man-environment relation.

- Students will get knowledge of various ecosystems of the earth.
- Students will get updated with the various International and National acts, conventions and treatise for the protection of environment.

SEMESTER II- 25 Credits (Core Course (C): 17 Credits; Elective Paper from other department (E): 4 Credits, Elective (E): 4 Credit)

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 801C	Climatology	4			4	100

At the end of the course student-

- Acquire knowledge about the Earth's atmosphere.
- Apply knowledge about atmospheric pressure and winds influences on climate.
- Understand the role of atmospheric moisture,
- Apply the learned knowledge in day-to-day life role of weather and climatic changes.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 802C	Fundamentals of Remote Sensing and GIS	4			4	100

At the end of the course student-

- Acquire knowledge about analyze and interpretation of aerial photographs and understand the principles of remote sensing, sensor resolutions etc.
- Acquire knowledge about image interpretation, image classification, and major satellite sensor and utilizations.
- Know to use Geographic Information System (GIS) software for contemporary mapping skills.
- Apply GIS to the preparation of different thematic maps.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 803C	Remote Sensing and GIS (Practical)			5	5	100

At the end of the course student-

- Apply Aerial Photographs for preparation of LULC map.
- Apply knowledge to prepare density slicing, supervised and unsupervised classification maps through satellite images in ILWIS software.
- Apply knowledge to digitize satellite images for prepare the maps through QGIS.
- Apply knowledge for preparation and analyzing maps like e the DEM, DTM, TIN etc through QGIS software.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 804C	Social and Political Geography	4			4	100

At the end of the course student-

- will be able to learn and understand about the nature and scope of social geography and its relationship with other disciplines.
- Will get an idea about the development of social geography in India.
- Will be able to identify the patterns of geographical distribution of tribes, caste, languages and religions.
- Will be able to identify the socio-cultural regions of India.
- will be able to learn and understand nature and scope of political geography and its relationship with other disciplines.
- Will understand the theories of political geography.
- Will understand the concepts and classification of state, nation, frontiers, boundaries, territory etc.
- Will get an idea about electoral geography.
- Will understand the geostrategic views.
- Will have an idea about the conflicts and disputes based on religion, language, resources and the conflict resolution through global and regional association and organizations.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 805E	Geography of North-East India & Tripura	4			4	100

At the end of the course student-

- Acquire knowledge on physical environment of North-east India in general and Tripura in particular.
- Develop ideas on natural resource bases and their management for regional development.
- Know demographic pattern of the region with the history of abnormal growth of population in Tripura.
- Idea on potentialities and prospects for economic development of the northeastern region with particular reference to Tripura.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 806E	Soil & Biogeography	4			4	100

At the end of the course student-

- Understand the soil structure and formation of soils.
- Understand soil classification and major soil groups in India.
- Awareness about causes of soil pollution and environmental degradation.
- Acquire knowledge about the role of biodiversity and conservation of forest and wildlife.
- Know the wildlife acts and policies.

Course Code	**Name of the Course**	**Credit Distribution**			**Total Credit**	**Marks (Scaled)**
		L	**T**	**P**		
GEDM 807E	Geography of Tourism	4			4	100

At the end of the course student-

- To understand the significance of Tourist resources, related factors and philosophy, problem.
- To discuss the significance of Conservation of tourist spots.
- To corelate tourism management and economic development.
- To review the Tourism planning, strategy

SEMESTER II- 21 Credits (Core Course (C): 17 Credits; Elective (E): 4 Credit)

Course Code	**Name of the Course**	**Credit Distribution**			**Total Credit**	**Marks (Scaled)**
		L	**T**	**P**		
GEDM 901C	Hazard and Disaster Management	4			4	100

At the end of the course student-

- Will be able to understand the concepts of hazards and disasters.
- Will know the different types of hazards and disasters.
- Will understand the causes and consequences of hazards and disasters.
- Will have an idea disaster management of hazards and disasters.

Course Code	**Name of the Course**	**Credit Distribution**			**Total Credit**	**Marks (Scaled)**
		L	**T**	**P**		
GEDM 902C	Geographical Thought	4			4	100

At the end of the course student-

- To identify historical evolution of the progress of geographical knowledge
- To gather knowledge about the philosophical contribution of philosophers and relate with different philosophical theorization
- To understand gradual Changing world and its geographical analysis, philosophical debate
- To discuss evolution of thought process the Indian geography

Course Code	**Name of the Course**	**Credit Distribution**			**Total Credit**	**Marks (Scaled)**
		L	**T**	**P**		
GEDM 903C	Research Methods and Techniques in Geography	4			4	100

At the end of the course student-

- Get to learn how to prepare a research work starting from identifying the problem, preparing the hypothesis and deriving the objectives to understanding the problem.

- learn to resolve the issues both quantitatively and qualitatively and finally how to present it as a report.
- Understand formulate research based on specific problems in Geography and Disaster Management.
- Know how to prepare hypothesis and ask research questions.
- Know how to review literature from a specific field of research.
- Know how to devise methodology based on different studies.
- Know how to carry out research based on suitable statistical methods.
- Know how to analyse the data.
- Know how to write the results of the study and discuss w.r.t similar studies.
- Know how to write the final report in the form of dissertation.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 904C	Surveying & Field Report			5	5	100

At the end of the course student-

- Students get to physically verify the problems and issues related to urban and rural areas by visiting the spot and interacting with the various stakeholders of the region.
- To Measure a physical object/ area of a geographical space with survey instrument; Mathematical Calculation and drawing of a map/ plan.
- Process of primary data collection through different methods, interaction and knowledge of analysis of real society, identification of physio-socio-economic issues, connect social issues and geographical knowledge.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 905E	Natural Resource Management	4			4	100

At the end of the course student-

- Students will learn the various types and distribution of natural resources.
- Students will understand the importance of conservation and management of natural resources.
- Students will get update with the Know the major resource region in India and North-East India.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 906E	Hydrology & Water Resource Management	4			4	100

At the end of the course student-

- Acquire the knowledge on hydrological parameters.
- Know the importance of surface water hydrology and surface water resources in India.
- Apply the knowledge for estimation of groundwater resources and flow.

- Apply the knowledge when society facing challenges like drought, floods, water conflicts, water contamination etc.
- Suggest to public importance of water harvesting and conservation.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 907E	Urban Geography	4			4	100

At the end of the course student-

- To get information and Evolution of urban geography and urbanization in terms of spatio-temporal context .
- To corelate the urban infrastructure associated with urban issues and environment.
- To Symbiotic relationship between Urban economy and urban population.
- To analyse critically the urban environmental problem.

SEMESTER IV- 19 Credits (Core Course (C): 15 Credits; Elective (E): 4 Credit)

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 1001C	1- Fluvial Geomorphology	4			4	100

At the end of the course student-

- Understand the mechanism of stream hydraulics.
- Acquire knowledge on river morphology.
- Could identify structural and lithological controls upon the stream channels and different drainage patterns.
- Gain analytical efficiency to highlight the impact of human being on river.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 1001C	2- Regional Planning & Development	4			4	100

At the end of the course student-

- To make a detailed analysis of region and regionalization area-bases planning.
- To get information about theories and models of regional Planning.
- To analyse the issues related to Urban issues and development.
- To analyse the issues related to Rural Planning and development.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		

GEDM 1001C	3- Transport Geography	4			4	100

At the end of the course student-

- Understand the concepts of transportation in relation spatial interconnection and the recent trends in transportation.
- Get an idea about demand and supply and transport economics.
- Acquire knowledge about trade, its global and local patterns
- Understand the dynamics of different transport modes
- Obtain an idea about various transport policies and its implications
- Will be able to relate with the real-life issues of transport, particularly in an urban landscape.
- The students will be able to understand the concepts of transportation and will be able to relate with the real-life issues of transport, particularly in an urban landscape.

Course Code	**Name of the Course**	**Credit Distribution**			**Total Credit**	**Marks (Scaled)**
		L	**T**	**P**		
GEDM 1001C	4- Applied Studies in Resources & Environmental Management	4			4	100

At the end of the course student-

- Know the major resources in India and Tripura.
- Understand the effects of flash floods, droughts, cloudburst and cyclones.
- Know the effectiveness of land-induced disaster.
- Acquire knowledge on forest fire, man-wildlife conflict, nuclear hazard etc.

Course Code	**Name of the Course**	**Credit Distribution**			**Total Credit**	**Marks (Scaled)**
		L	**T**	**P**		
GEDM 1001C	5- Population & Resource	4			4	100

At the end of the course student-

- will be able to understand the components of population change, their trends and geographical patterns and its implications.
- Will be able to corelate the relationship between population and resource.
- Will understand the trends, patterns and implications of different population groups.
- Will know about the distribution and access to resources based on gender, location, caste, tribe, ethnicity and religion.
- Will understand the conflicts on access and distribution to resource.
- Will have an idea about the trends and patterns of resource consumption and its effect on the environment.

Course Code	**Name of the Course**	**Credit Distribution**			**Total Credit**	**Marks (Scaled)**
		L	**T**	**P**		

GEDM 1001C	6- Watershed Management	4			4	100

At the end of the course student-

- Know watershed concepts, character sic and significance of watershed
- Acquire knowledge relation between water and soil.
- Acquire knowledge on water resource appraisal.
- Acquire knowledge importance of soil and water conservation, and watershed management and planning.

Course Code	**Name of the Course**	**Credit Distribution**			**Total Credit**	**Marks (Scaled)**
		L	**T**	**P**		
GEDM 1002C	1- Fluvial Geomorphology (Practical)			5	5	100

At the end of the course student-

- Could analyse drainage basin through various morphometric techniques.
- Acquire practical knowledge to analyse spatial-temporal changes in river morphology.
- Could generate hydrological data through field investigation.
- Develop skill to represent cartographic data using MS excel and to prepare vector layers from raster maps using GIS technique.

Course Code	**Name of the Course**	**Credit Distribution**			**Total Credit**	**Marks (Scaled)**
		L	**T**	**P**		
GEDM 1002C	2- Regional Planning & Development (Practical)			5	5	100

At the end of the course student-

- To analyse the regional concentration and disparity
- To analyse the correlation of transport and Regional Development
- To analyse Regional Growth.
- To make Dissertation oriented on real regional Problems/issues.

Course Code	**Name of the Course**	**Credit Distribution**			**Total Credit**	**Marks (Scaled)**
		L	**T**	**P**		
GEDM 1002C	3- Transport Geography (Practical)			5	5	100

At the end of the course student-

- Will get an idea about how the transportation network of an area can be estimated and how to identify the lacunae therein.
- Gets a hand-on experience on the use of instruments and GIS in transportation analysis
- Get to learn how to identify and resolve problems related to transport through their dissertation work.

Course Code	**Name of the Course**	**Credit Distribution**			**Total Credit**	**Marks (Scaled)**
		L	**T**	**P**		

GEDM 1002 C	4- Applied Studies in Resources & Environmental Management (Practical)			5	5	100

At the end of the course student-

- Get knowledge about soil testing parameters.
- Gets knowledge about water quality parameters.
- understand the use of climograph, hythergraph, ergograph etc.
- SWOT analysis.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 1002 C	5- Population & Resource (Practical)			5	5	100

At the end of the course student-

- Will be able to measure and apply the components of population change
- Will be able to measure and apply the components of population distribution.
- Will be able to measure and apply the components of population composition.
- Will be able to measure and apply the components of inequality.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 1002 C	Watershed Management (6) (Practical)			5	5	100

At the end of the course student-

- Apply knowledge to morphometric analysis.
- Apply to know water surplus and deficit areas.
- Apply to know the water quality for the purpose of domestic and agricultural use.
- Apply knowledge to know land capability and suitability of crops.
- Apply to prepare maps of land capability, NDWI, MNDWI, SWAT etc through GIS environment.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 1003C	Dissertation			6	6	100

At the end of the course student-

- Acquire knowledge for preparation of research problem.
- Know the frame objectives and research questions.
- Know the collection of primary and secondary data.
- Know the application of suitable statical methods according to research problem.
- Acquire knowledge analysis of data on objectives oriented.
- Acquire knowledge to delineate the results and conclusion.

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 1004 E	Industrial Geography	4			4	100

At the end of the course student-

- To understand the classification, evolution of Industry.
- To get knowledge about Industrial Theory with present day relevance
- To know about Industrial policy of India, Industrial labour class, labour law.
- To identify the Problems and issues of related to industry, resources, market

Course Code	Name of the Course	Credit Distribution			Total Credit	Marks (Scaled)
		L	T	P		
GEDM 1005 E	Historical and Cultural Geography	4			4	100

At the end of the course student-

- Understand the concepts of culture, cultural landscapes and cultural ecology.
- Gets to know how cultural diffusion occurs and can distinguish ideas related to acculturation, assimilation etc.
- Enhance knowledge about global culture, culture and technological development and hybridization of world culture.
- Will be able to understand the nature and scope of historical geography.
- Identify the sources of historical geography.
- Have knowledge about the territorial organisations and the socio-economic condition of India during the ancient, medieval and colonial period.

REVISED SYLLABI
FOR
M.A./M.Sc.
IN
GEOGRAPHY AND DISASTER MANAGEMENT
(2020-21)

Approved

12/10/2020
Member
BOPGS
Geography & Disaster Management
Tripura University

Revised Syllabi approved.

External Member
BOPGS
Geography & Disaster Management
Tripura University

12/10/2020
Member
BOPGS
Geography & Disaster Management
Tripura University

Dr. Mehtab Singh
Professor
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Approved

12/10/2020
Chairman
BOPGS
Geography & Disaster Management
Tripura University

DEPARTMENT OF GEOGRAPHY AND DISASTER MANAGEMENT
TRIPURA UNIVERSITY (A CENTRAL UNIVERSITY)
SURYAMANINAGAR - 799022,
WEST TRIPURA, TRIPURA

Brief about the Revised Syllabus

The Department of Geography & Disaster Management, since its inception in 2004, started M.A./M.Sc. programme and the Ph.D programme was offered from the year 2008. The department had revised its syllabi from time to time to keep pace with the latest trend in the field of Geography & Disaster Management. In fact, the present revision of the syllabi is an attempt to reflect the objective of the CBCS system. Prominent features of the Revised Syllabi are as follows:

1. The M.A./M.Sc. programme in Geography & Disaster Management is of 86 Credits (2000 marks), including Theory Papers, Practicals, Study Tour and Dissertation.
2. The entire credits are spread over in four semesters.
3. Credit distribution of the courses ranges from 4 to 6 credit.
4. Core courses are compulsory.
5. Students will choose one elective course in each semester out of 3/2 course.
6. Students will choose one elective course (04 credit) from other departments which is mandatory in 2nd Semester.
7. CSK-II is compulsory in 1st Semester.
8. Field study tour will be conducted for at least 2-3 weeks outside the State in the 3rd Semester.
9. Dissertation of 6 credit, related to the Special Papers is mandatory in the 4th Semester.
10. Four new courses have been introduced in the revised syllabi i.e. Remote Sensing and GIS Theory (Core), Research Methods and Techniques in Geography Theory (Core), Hazard and Disaster Management Theory (Core) and Environment and Ecosystem Theory (Elective).
11. The department will offer a few courses to the students of other departments and also an open choice to the students of Geography & Disaster Management.
12. However, the department will review, from time to time, the courses that are placed under open choice category by considering the demand of the students of the department, as well as the students from other departments.

Division of credits and marks

Semester	Core Course				Elective Course		Total Credits	**Total Marks**
	Theory		Practical		Credits	Marks		
	Credits	Marks	Credits	Marks				
I	12	300	5	100	4	100	21	**500**
II	12	300	5	100	8*	200	25	**600**
III	12	300	5	100	4	100	21	**500**
IV	4	100	11	200	4	100	19	**400**
Total	**40**	**1000**	**26**	**500**	**20**	**500**	**86**	**2000**

***** Including 4 credit from other department.

M.A/ M.Sc. in Geography & Disaster Management

Structure of the Syllabi

Semester - I

Course Code	Name of the Course	No. of Periods	Credit	Internal Assessment	End Sem. Exam	Marks
GEDM 701C	Geomorphology	72	04	30	70	100
GEDM 702C	Population & Settlement Geography	72	04	30	70	100
GEDM 703C	Statistical Techniques and Cartography (Practical)	90	05	30	70	100
CSK- II	# Compulsory paper i.e. Computer Skill-II		04	30	70	100
Elective Course (select any one)						
GEDM 704E	Agricultural Geography	72	04	30	70	100
GEDM 705E	Regional Geography of India	72	04	30	70	100
GEDM 706E	Environment & Ecosystem	72	04	30	70	100
Credit: 21					**Total Marks: 500**	

Semester- II

Course Code	Name of the Course	No. of Periods	Credit	Internal Assessment	End Sem. Exam	Marks
GEDM 801C	Climatology	72	04	30	70	100
GEDM 802C	Fundamentals of Remote Sensing and GIS	72	04	30	70	100
GEDM 803 C	Remote Sensing and GIS (Practical)	90	05	30	70	100
GEDM 804C	Social and Political Geography	72	04	30	70	100
# Students will have to choose one elective paper from other departments (CBCS) which is compulsory.			04	30	70	100
Elective Course (Select any one)						
GEDM 805E	Geography of North-East India & Tripura	72	04	30	70	100
GEDM 806E	Soil & Biogeography	72	04	30	70	100
GEDM 807E	Geography of Tourism	72	04	30	70	100
Credit: 25					**Total Marks: 600**	

Semester - III

Course Code	Name of the Course	No. of Periods	Credit	Internal Assessment	End Sem. Exam	Marks
GEDM 901C	Hazard and Disaster Management	72	04	30	70	100
GEDM 902C	Geographical Thought	72	04	30	70	100
GEDM 903C	Research Methods and Techniques in Geography	72	04	30	70	100
GEDM 904C	Surveying & Field Report (Practical)	90	05	30	70	100
Elective Course (Select any one)						
GEDM 905E	Natural Resource Management	72	04	30	70	100
GEDM 906E	Hydrology & Water Resource Management	72	04	30	70	100
GEDM 907E	Urban Geography	72	04	30	70	100
Credit: 21						**Total Marks: 500**

Semester - IV

Course Code	Name of the Course	No. of Periods	Credit	Internal Assessment	End Sem. Exam	Marks
GEDM 1001C (Special Paper Theory)	Fluvial Geomorphology (1)	72	04	30	70	100
	Regional Planning & Development (2)	72	04	30	70	100
	Transport Geography (3)	72	04	30	70	100
	Applied Studies in Resources & Environmental Management (4)	72	04	30	70	100
	Population & Resource (5)	72	04	30	70	100
	Watershed Management (6)	72	04	30	70	100
GEDM 1002C (Special Paper Practical)	Fluvial Geomorphology (1)	90	05	30	70	100
	Regional Planning & Development (2)	90	05	30	70	100
	Transport Geography (3)	90	05	30	70	100
	Applied Studies in Resources & Environmental Management (4)	90	05	30	70	100
	Population & Resource (5)	90	05	30	70	100
	Watershed Management (6)	90	05	30	70	100
GEDM-1003C	Dissertation		06	30	70	100
Elective Course (Select any one)						
GEDM 1004E	Industrial Geography	72	04	30	70	100
GEDM 1005E	Historical and Cultural Geography	72	04	30	70	100

Credit: 19	**Total Marks: 400**
Total Credit: 86; Grand Total: 2000 **#=Compulsory; C=Core; E=Elective; 1 Credit= 4 hours;**	

Semester -I

GEOMORPHOLOGY
Pape Code: GEDM 701C

Credits: 04 **No. of Periods: 72**
Marks: 100

Unit I: Basic concepts of Geomorphology: Definition and scope of geomorphology; Sources of energy for geomorphological processes; Scale of landform units; Climate and Geomorphology: Diagnostic landforms, Geomorphic processes and Climatic controls, Climatic changes and landforms, Morphogenetic regions, Equilibrium; Geomorphic systems, People as geomorphic agents.

Unit II: Geo-tectonics: Orogenesis, Sea floor spreading; Plate tectonics; Tectonic movements and landforms: Fold and Fault; Earthquake and Vulcanicity.

Unit III: Denudational Processes: Weathering, Mass movement and erosion; Models of slope evolution: Davis, Penck, King.

Unit IV: Evolution of landforms: Karst, Periglacial, Aeolian and Coastal landforms; Folded, Uniclinal and Domal structures.

References

1. Thornbury W.D. (1984): Principles of Geomorphology, 2nd Edition, Wiley Eastern Ltd., New Delhi.
2. Singh, S. (1998): Geomorphology, Prayag Pustak Bhawan, Allahabad.
3. Dayal, P. (1996): A Text Book of Geomorphology, Shukla Book Depot, Patna, Bihar.
4. Small R.J. (1978): The Study of Landforms: A Text book of Geomorphology, Cambridge University Press, London.
5. Strahler, A. H and Strahler, A.N. (1992): Modern Physical Geography, John Wiley, New York.
6. Morgan, R.S. and Wooldridge, S.W. (1988): An Outline of Geomorphology, Orient Longman.

POPULATION AND SETTLEMENT GEOGRAPHY

Pape Code: GEDM 702C

Credits: 04 **No. of Periods: 72**
Marks: 100

Group A: Population Geography

Unit I: Population Geography: Nature, evolution and scope of population geography; Sources of Population Data: India-census, CRS, NSS and NFHS, international sources;
Population Composition: Age: age groups, dependency ratio, age sex pyramid, geographic pattern and trends in world and India; Sex: geographic pattern and trends in world and India; Literacy: geographic pattern and trends in world and India; Rural- Urban: geographic pattern and trends in world and India.

Unit II: Theories of Population: Malthus and his Critique; the Demographic Transition Theory; Fertility and Mortality: Measurements, geographic pattern and trends in world and India; Migration: Theories, typologies, geographic pattern and trends in world and India; Causes and Consequences; Population policies and planning: Political Economy of Population and the Politics of Population Control.

Group B: Settlement Geography

Unit III: Human Settlements and aspects of Rural Settlements
Nature and scope of settlement geography; Types of Settlement: Urban and Rural; Villages and Hamlets; Size, spacing, types, pattern of rural settlements; Spatial distribution of Rural Settlements; Neighborhood Analysis; Environment and House types- Illustration from India; Rural Urban Fringe; Rural Urban Continuum

Unit IV: Urban Settlement System
Rank Size Principles; Central Place Theory: Concepts of Threshold and Range; Settlement Hierarchy; Type of urbanized regions: Conurbation, Metropolis, Megalopolis; Classical and modern concepts of internal structure of towns: Concentric, Sector and Multiple Nuclei theories; Mann model, social area analysis; CBD; Model of spatial structure: Sjoberg; Concept of City region

References

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3. Chandna R.C. 2000. *Geography of population: concept, determinants and patterns*, Kayani Publishers.
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16. Srinivasan, K. 2017. *Population Concerns in India: Shifting Trends, Policies, and Programs*, New Delhi: Sage.
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19. Carter, H. 1981: Urban Geography, 3rd edition Arnold-Heinemann, New Delhi
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21. Dickinson, R.E. 1968: City and Region: A Geographical Interpretation, Routledge and Kegam Paul Ltd. London.
22. Diddee, J., 1997: Indian Medium Towns, Rawat Publications, Jaipur.
23. Ghosh, S. 1998: Introduction to Settlement Geography, Orient Longman Ltd., Calcutta
24. Herbert, D.T.,Johnston,R.J.,1982,Geography and the Urban Environment, John Wiley& Sons
25. Hudson, F.S. 1970: Geography of Settlements, Macdonald and Evans Ltd., Plymouth
26. Husain, Majid, 1994, Human Geography, Rawat Publications
27. Johnston .R.J (2000): The Dictionary of Human Geography,Blackwell. UK
28. Mandal, R.B. (2000): Urban Geography: A Textbook, Concept Pub. Co., New Delhi.
29. Mandal, R.B. 1988: Systems of Rural Settlements in Developing Counties, Concept Pub. Co., New Delhi
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32. Pacione, M., 2001: Urban Geography, Routledge, London Panda,
33. Ramachandran R. 1989: Urbanisation arid Urban Systems in India, Oxford University Press, New Delhi.
34. Rao, R. Rammohan and S. Simhadri 1999: Indian Cities: Towards Next Millenium, Rawat Publications, Jaipur.
35. Siddharth, K. and Mukherjee, S. (2013): Cities, Urbanization and Urban System, Kisalaya Publishing, New Delhi
36. Singh, R. Y. 1994: Geography of Settlements, Rawat Pub. Co., New Delhi Singh,
37. R.L. et. al. (ed) 1976: Geographic Dimensions of Rural Settlements, National Geographical Society of India, Varanasi.

38. Smith D.M. 1980: Human Geography a Welfare Approach, Edward Arnold Smith, M. Peter, 2001: Transnational Urbanism, Blackwell Publishers
39. Taylor, G. 1949: Urban Geography, Methuen and Co. Ltd., London.
40. Tewari, V. Weinston, J. and Prakash Rao, V.L.S. 1986: Indian Cities: Ecological Perspectives, Concept Pub. Co., New Delhi
41. Verma, L.N., 2006, Urban Geography, Rawat Publications
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43. Yadav, C.S. (ed.), 1986, Models in Urban Geography, Part-I, Theoretical, Concept Publishing Company
44. Carter, H. 1981: Urban Geography, 3rd edition Arnold-Heinemann, New Delhi
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46. Dickinson, R.E. 1968: City and Region: A Geographical Interpretation, Routledge and Kegam Paul Ltd. London.
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60. Siddharth, K. and Mukherjee, S. (2013): Cities, Urbanization and Urban System, Kisalaya Publishing, New Delhi
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63. Smith D.M. 1980: Human Geography a Welfare Approach, Edward Arnold Smith, M. Peter, 2001: Transnational Urbanism, Blackwell Publishers
64. Taylor, G. 1949: Urban Geography, Methuen and Co. Ltd., London.
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66. Verma, L.N., 2006, Urban Geography, Rawat Publications
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68. Yadav, C.S. (ed.), 1986, Models in Urban Geography, Part-I, Theoretical, Concept Publishing Company

STATISTICAL TECHNIQUES AND CARTOGRAPHY (Practical)

Paper Code: GEDM 703C

Credits: 05 **No. of Periods: 90**
Marks: 100

Unit I: Sampling; Centrographic Measures: Mean, Median Centre, Standard Distance.

Unit II: Geographical Data Matrices: Attribute/ Structural Matrix, Interaction/ Behavioural Matrix.

Unit III: Association and Correlation: Chi-square Analysis, Scatter Diagram, Rank and Product Moment Correlation, Regression and Residuals.

Unit IV: Network Analysis: Concept of Graph Theory and Transport Network; Drainage Basin Analysis: Stream Ordering, Bifurcation Ratio; Spatial Simulation: Deterministic and Probabilistic Models.

Reference:

1. Alvi, Z. (1995): Statistical Geography: Methods and Applications. Rawat Pub., New Delhi.
2. Hammond, R. and McCullagh, P. (1991): Quantitative Techniques in Geography. Clarendon Press, Oxford.
3. Johnston, R.J., (1978): Multivariate Statistical Analysis in Geography. Longman King, L.J.
4. Pal, S.K. (1999): Statistics for Geoscientists. Concept publishing Company, New Delhi.
5. Rogerson, P. A. (2010): Statistical Methods for Geography. Sage Publications, London.
6. Sarkar, A. (2013): Quantitative Geography: Techniques and Presentations. Ashis Sarkar. Orient Blackswan Pvt. Ltd., New Delhi.
7. M, Aslam.(2008): Statistical Methods in Geographical Studies. Rajesh Pub., New Delhi.

AGRICULTURAL GEOGRAPHY
Paper Code: GEDM 704E

Credits: 04 **No. of Periods: 72**
Marks: 100

Unit-I: Determinants of agricultural land use – Physical, socio- economic, technological and institutional; Land holdings; Agricultural development: pre-independence and post-independence periods of India; Approaches to land use survey.

Unit-II: Agricultural Regionalisation: Concept and criteria of land capability classification; land capability classification in India; Whittlesey's agricultural regions; Agricultural types; Agricultural regions of India; Land capability and land use planning in India.

Unit-III: Models in Agricultural Geography: Locational model, Diffusion model, and Decision-making models; Category model of NRSA; Crop diversification; Agricultural Productivity: Concept, determinants and methods of its measurement; Regional imbalances in agricultural development in India.

Unit-IV: Agricultural problems in India and its management; Sustainable Agricultural Development: concept and methods; issues of sustainable development; farm technology, Krishi Vigyan Kendra.

References:

1. Basu, D.N., and Guha, G.S. (1996): *Agro-Climatic Regional Planning in India,* Vol I and II, Concept Publications, New Delhi.
2. Chorley, R. J., and Haggett, P. (1971): *Socio-Economic Models in Geography*. Methuen and Co.Ltd., London.
3. D'Souza G.E., and Gebremedhin, T.G. (ed) (1998): *Sustainability in Agriculture and Rural Development*. Ashgate Publishing Co., Aldershot.
4. Fabos, J.G. (1985): *Landuse Planning : From Global to Local Challenge*. Bowden and Culver, NY.
5. Grigg, D.B. (1984): *Introduction to Agricultural Geography*. Hutchinson, London.
6. Hussain, M. (1978): *Agricultural Geography*. Rawat Publication, Jaipur.
7. Ilbery, B. W. (1991): *Agricultural Geography: Social and Economic Analysis*, International Book House, Delhi.
8. Mohammad, N. (1992): *New Dimension in Agriculture Geography*. Vol. I to VIII, Concept Publishing Company, New Delhi.
9. Roling, N.G., and Wageruters, M.A.E. (eds.) (1998): *Facilitating Sustainable Agriculture*. Cambridge University Press, Cambridge.
10. Shafi, M. (2006): *Agricultural Geography*. Pearson Education, Delhi.
11. Singh, J., and Dhillon, S.S. (1994): *Agricultural Geography*. Tata McGraw Hill, New Delhi
12. Singh, R. B. (2000): Environmental Consequences of Agricultural Development: A Case Study from the Green Revolution state of Haryana, India, *Agriculture, Ecosystems and Environment* 82, 97–103.
13. Symons, L. (1970): *Agricultural Geography*: G. Bell and Sons Ltd., London..
14. Vaidya, B. C. (1997*): Agricultural Land use in India*: Manak Publications, New Delhi.
15. Wheeler, K.B., Ladley, A.M. and Leong, F.G. (1970): *Studies in Agricultural Geography*. Bland Educational,
16. Wright, J. (2009): *Sustainable agriculture and food security in an era of oil scarcity*. Earthscan, London.

REGIONAL GEOGRAPHY OF INDIA

Pape Code: GEDM 705E

Credit: 04 **No. of Periods: 72**

Marks: 100

Unit I: Region and Regionalization: Basic Concept of Region, Defining a Region: Fluidity and Purposiveness; Typology of Regions: Resource Regions, Mega, Macro, Meso and Micro Regions; Delineation of Regions: Techniques of Grouping; Classification and Regionalisation.

Unit II: Regional Classification of India: Physical Regions: Schemes of O. H. K. Spate and R. L. Singh; Agro-climatic Regions: Case Studies; Industrial Regions: Special Economic Zones; Cultural Regions: Variables and Methods.

Unit III: Regional Disparities: Concept and Methods of Regional Disparities; Backward Regions: Factors, Indicators; Tribal Area Development, Project work on issues on regional disparity.

Unit IV: Policy Framework in Regional Development: Challenges and Opportunity for Innovative Sustainable Regional Development; Regional Cooperation: Pattern, Structure and Potentiality; Case Study of BBIN, SAARC, BRICS, ASEAN, APEC, G7, G20 in Regional Development; Regional Issues and Policy Approach

Reference

1. Bhatt, L. S. (2009). Geography in India: Selected Themes. New Delhi: Indian Council of Social Science Research.
2. Goswami, A. (2001). Regional Disparities in India. New Delhi: Akansha Publishing House.
3. Mandal, R. B. (1990). Patterns of Regional Geography: Indian perspective. India: Concept Publishing Company.
4. Minshull, R. (2017). Regional Geography: Theory and Practice. United Kingdom: Taylor & Francis.
5. Misra, R. P. (1992). Regional Planning: Concepts, Techniques, Policies and Case Studies. New Delhi: Concept Publishing Company.
6. Ray Chaudhuri, J. (2001). An Introduction to Development and Regional Planning: With Special Reference to India. India: Orient Longman.
7. Sengupta, S., Nag, P. (1992). Geography of India. India: Concept Publishing Company.
8. Singh, R.L. (1993). India: A Regional Geography. New Delhi: National Geographical Society of India.
9. Spate, O. H. K. (1984). India & Pakistan: A General & Regional Geography. India: South Asia Books.
10. Tirtha, R. (2002). Geography of India. India: Rawat Publications.

ENVIRONMENT AND ECOSYSTEM
Paper Code: GEDM 706E

Credits: 04 **No. of Periods: 72**
Marks: 100

Unit-1: Physical components of the Environment; Socio-cultural Components of the Environment; Environmental perceptions and behaviors; Approaches to Man-Environment relationship; Global Environment problems; Sustainable development: concept and goals.

Unit-II: Ecology and Ecosystem; concept of Ecology, Ecosystem, Human ecology, Laws of Thermodynamics, Function and Structure of Ecosystem, Energy flow in Ecosystem, Ecological pyramids,

Unit-III: Mountain Ecosystem: Man-environment relationship; Sustainable development of Mountain ecosystem; Forest ecosystem: Forest degradation problems and management; Urban ecosystem: problems and management; Wetland ecosystem: problems and management.

Unit-IV: Environmental Protection Act-1986; National Environment policy: 2006; Wildlife Act; Biodiversity Act; Climate change negotiation under cop21; National Action plan on climate change.; International treaties and conventions on Environment; Environmental Impact Assessment and Environmental Management Plan.

References:

1. Anjaneyulu, Y. (2004): *Introduction to Environmental Science*. B.S Publication, New Delhi.
2. Balakrishnan, M. (1998): *Environmental Problems and Prospects in India*. Oxford &IBH Pub., New Delhi.
3. Chary, S. N. (2008): *Environmental Studies*. Macmillan Publication.
4. Craig, J.R., Vaughan, D.J. Skinner, B.J. (1996). *Resources of the Earth: Origin, Use, and Environmental Impact* (2nd ed). Prentice Hall, New Jersey.
5. Cunninghum, W. P. and Cunninghum, M. A. (2004): *Principles of Environmental*
6. Divan, S. and Rosencrantz, A. (eds). (2001). *Environmental Law and Policy in India: Cases, Materials and Statutes*. Oxford University Press, New Delhi,
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9. Gole, P. (2001): *Nature Conservation and Sustainable Development in India*. Rawat Pub., Jaipur.
10. Gupta. K.M. (ed.), (1990): *Himalaya: Man, and Nature*. Lancer Books, New Delhi.
11. Hussain, M. (ed.), (1996): *Environmental Management in India*. Rawat Pub., Jaipur.
12. Kormondy, E.J. (1996): Concepts of Ecology. Prentice Hall Inc., New Jersey.
13. Lall, J.S. (ed.), (1981): *The Himalaya: Aspects of Change*. Oxford University Press, Delhi.
14. MoEF (2006): National Environmental Policy-2006, Ministry of Environment and
15. Odum, E.P. (1971): *Fundamentals of Ecology*. WB Saunders, USA.

16. Pandey, B. W., Negi, V. S., and Kumria, Poonam. (2018) *Environmental Concerns and Sustainable Development in Himalaya*. Research India Press, New Delhi.
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18. Rogers, P.P., Jalal, KF and Boyd, J.A. (2007*): An Introduction to Sustainable Development*. Earth Scan, London.
19. Santra, S. C. (2001): *Environmental Science*. New Central Book Agency.
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24. Singh, G. (2004). *Environmental Law in India*. Mcmillan& Co.
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26. Singh, R.B. and Misra, S. (1996): *Environmental Laws in India: Issues and Responses*. Rawat Pub., New Delhi.
27. Singh, S. (1997) : *Environmental Geography*. Prayag Pustak Bhawan, Allahabad.
28. UNEP (2007): Global Environment Outlook: GEO4: Environment For Development, United Nations Environment Programme
29. Wathern, P. (editor) (1988): *Environmental Impact Assessment: Theory and Practice*,. Routledge, London.
30. Wright. R.T, and Nebel. B. J. (2004): *Environmental Science*, 8th ed. Prentice Hall India Ltd.

Semester -II

CLIMATOLOGY
Paper Code: GEDM 801C

Credit: 04 **No. of Periods: 72**
Marks: 100

Unit I: Introduction: Nature and scope of climatology, development of modern climatology and Tropical Climatology; Earth's atmosphere: structure and chemical composition; insolation: Solar radiation and terrestrial radiation, latitudinal and seasonal variations, greenhouse effect and heat budget; Temperature: measurement and control, lapse rate and inversion of temperature.

Unit II: Atmospheric pressure and winds: Measurement of pressure, vertical and horizontal distribution; Winds: observation and measurement, factors affecting wind, local winds; general circulation of the atmosphere, Jet Stream and Monsoon;

Unit III: Atmospheric moisture: Forms of condensation and precipitation, hydrological cycle; Atmospheric disturbances: cyclone and anticyclones; Classification of climate: Thornthwaite and Koppen.

Unit IV: Weather and climate changes: Weather forecasting and analysis; Natural and long-term causes of climatic changes; Climate and health; Climate and architecture; Urban climates; Climate and agriculture; Atmospheric pollutants.

References:

1. Critchfield H.J. (2005): General climatology, prentice Hall of India, Pvt. Ltd. New Delhi-01
2. Dasagupta A and Kapoor A.N. (1978): Principles of Physical Geography, Chand S & Co. Ltd. New Delhi.
3. John E. Oliver and John J. Hidore (2003): Climatology An Atmospheric Science (2nd Edition), published by Pearson Education (Singapore) Pte. Ltd., Indian Branch, 482 F.I.E. Patparganj, Delhi 110092,
4. Lal D.S (2009) : Physical Geography, Sharada Pustak Bhawan, II, University Road, Allahabad – UP.
5. Parmesan, C., Yohe, G. 2003. A globally coherent fingerprint of climate change impacts across natural systems. *Nature,* 421 (6918), 37–42.
6. Siddhartha K (2005): Atmosphere, weather and climate, Kisalaya Publications Pvt.ltd., C—2, Padma apartment, Mehruli, New Delhi-30.
7. Strahler A.N. (1976): The earth sciences, Harpu & Row, Intl. Ed. New York.
8. Trewartha G. T., 1980. *An Introduction to Climate*, McGraw Hill Company, New York. Von, A.W.S. (1962): An Introduction to Physical Oceanography, Addison, New York.

FUNDAMENTAL OF REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEM
Paper Code: GEDM 802C

Credit: 04 **No. of Periods: 72**
Marks: 100

Remote Sensing

Unit I: Introduction to photogrammetry: classification of photogrammetry, history & types of aerial photographs, elements of aerial photo interpretation, area estimation; Introduction of Remote Sensing: Definition, components of remote sensing, sensor resolution, remote sensing platforms, imaging system. Indian space programme.

Unit II: Image interpretation: elements of spatial, spectral, temporal identification; Digital image processing: Image enhancement, density slicing, principal component analysis; Image classification: unsupervised and supervised classification; Major satellites sensors and utilization: LANDSAT, Cartosat, Sentinel-2, GOES-16, IRS, MODIS, AVHRR, NOAA, INSAT, Nimbus, & CZCS; Characteristics of MSS, HRV & LISS.

Geographical Information System

Unit III: GIS: Definition, Application; Components of GIS; Historical development of GIS Technology; Analog vs Digital maps; Spatial object: point, line and Area; Spatial data models; Concept of Raster and vector data model, Coordinator systems and Projection.

Unit IV: Spatial data and attribute data; Data entry, Storage, Editing, Digitization, Representation of geography i.e. data base; Attribute data Management: Query and analysis; Spatial Analysis: Proximity analysis and buffers; Raster and Vector based overlay and their applications; Presentation of thematic map.

References:

1. Bhatta, B. (2010), Remote Sensing and GIS, Oxford University Press, New Delhi.
2. Burrough, P.A. and McDonnell, R. (1998): Principles of Geographic Information Systems. Oxford University Press, Oxford.
3. Chang, K.T. (2003): Introduction to Geographic Information Systems. Tata McGraw Hill, New Delhi.
4. Cracknell, A. and Hayes, L. (1990): Remote Sensing Year Book, Taylor & Francis, London.
5. Deekshatulu, B.L. and Rajan, Y.S. (ed.) (1984): Remote Sensing. Indian Academy of Science, Bangalore. 28
6. ESRI (1993): Understanding GIS. Redlands, USA
7. Floyd, F. and Sabins, Jr. (1986): Remote Sensing: Principles and Interpretation, W.H. Freeman, New York.
8. George, J. (2003): Fundamentals of Remote Sensing. Universities Press, Hyderabad.
9. Girard, C.M. (2003): Processing of Remote Sensing Data. Oxford, New Delhi.
10. Glen, E.M. and Harold, C.S. (1993): GIS Data Conversion Handbook. Fort Collins, Colorado.
11. Harry, C.A. (ed.) (1978): Digital Image Processing, IEEE Computer Society, California.
12. Leuder, D.R. (1959): Aerial Photographic Interpretation: Principles and Application. McGraw Hill, New York.
13. Longley, P. and Batty, M. (eds.) (1996): Spatial Analysis: Modelling in a GIS Environment. Geo-Information International, Cambridge.
14. Longley, P., Goodchild, M.F., Maguire, D. and Rhind, D. (1999): Geographic Information Systems. Principles, Techniques, Management, Applications. John Wiley, New York.
15. Nag, P. (ed.) 1992: Thematic Cartography and Remote Sensing, Concept, New Delhi.
16. Sabins, F.F. Jr, (1987), Remote Sensing; Principles and Interpretation, W.H. Freeman & Co., New York.

REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEM (Practical)
Paper Code: GEDM 803C

Credits: 05 **No. of Periods:90**
Marks: 100

Remote Sensing

Unit I: Aerial Photography: Stereoscope, Photo Mosaic, Preparation of LULC map; image processing: Data input, band combination, stretching, FCC, band combination of geology, geomorphology, drainage; NDVI.

Unit II: Digital Image Processing: Density slicing; Supervised and Unsupervised classification (Clustering); Principal Component Analysis.

Geographical Information System

Unit III: Geo-spatial Database: Data entry and map composition, Digitization, Editing, Plotting and Map Making, Topology, Raster and Vector database structures and conversions (Point, Line, Area and its measurement); Buffering and Neighborhood.

Unit IV: Interpretation of DEM, DTM and TIN; Raster and Vector Overlay; Spatial Analysis: Spatial Interpolation, Spatial Analysis Application-Land information system, resource management application, environment and Urban GIS.

Laboratory Notebook and Viva voce.

References:

1. Bonham, Carter G.F. (1995): Information Systems for Geoscientists – Modelling with GIS. Pergamon, Oxford.
2. Campbell, J. B. (2002): Introduction to Remote Sensing. Taylor & Francis, London.
3. Chauniyal, D.D. (2004): Remote Sensing and Geographic Information Systems. (in Hindi). Sharda Pustak Bhawan, Allahabad.
4. Cracknell, A. and Hayes, L. (1990): Remote Sensing Year Book, Taylor & Francis, London.
5. Curran, P.J. (1985): Principles of Remote Sensing, Longman, London.
6. Demers, M.N. (2000): Fundamentals of Geographic Information Systems. John Wiley, Singapore.
7. Fraser Taylor, D.R. (1991): Geographic Information Systems. Pergamon Press, Oxford.
8. George, J. (2003): Fundamentals of Remote Sensing. Universities Press, Hyderabad.
9. Goodchild, M.F.; Park, B.O. and Steyaert, L.T. (ed.) (1993): Environmental Modelling with GIS. Oxford University Press, Oxford.
10. Guham, P.K. (2003): Remote Sensing for Beginners. Affiliated East-West Press, New Delhi.
11. Hallert, B. (1960): Photogrammetry, McGraw Hill, New York
12. Heywood, I. (2003): An Introduction to Geographical Information Systems. 2nd edition, Pearson, Singapore.
13. Hord, R.M. (1982): Digital Image Processing of Remotely Sensed Data, Academic Press, New York.
14. Lillesand, T.M. and Kiefer, R.W. (2000): Remote Sensing and Image Interpretation. John Wiley, New York.
15. Lo, C.P. and Yeung, A.K.W. (2002): Concepts and Techniques of Geographic Information Systems. Prentice Hall, New Delhi.
16. Ralston, B. A. (2002): Developing GIS Solutions with Map Objects and Visual Basic, Thompson Learning, Singapore.

17. Rampall, K.K. (1999), hand book of Aerial Photography and Interpretation, Concept Publishing Co., New Delhi.
18. Reddy, M.A. (2001): Textbook of Remote Sensing and Geographic Information Systems. B. S. Publications., Hyderabad.
19. Sahu, K.C. (2007): Textbook of remote sensing and Geographical Information Systems. Atlantic Publishers, New Delhi.

SOCIAL AND POLITICAL GEOGRAPHY
Paper Code GEDM: 804C

Credit: 04 **No. of Periods:72**
Marks: 100

Group A: Social geography

Unit I: Defining social geography: nature, evolution and scope of social geography and its relationship with other disciplines; development of Social Geography in India: evolution.

Unit II: Elements of social geography and concept of social differentiation
Caste: Geographical pattern, classification, caste and settlement morphology; tribe: geographical pattern, penetration of tribal regions; religions: major and minor religions, tribal religions, geographical patterns**;** Languages: linguistic diversity, Geographical pattern, language retention and language shift; socio-cultural regions of India: geographical pattern.

Group B: Political geography

Unit III: Nature, evolution and scope of political geography and its relationship with other disciplines; Theoretical contributions to political geography: Ratzel, Hartshorne, Taylor and Harvey; Concept and evolution of state, nation, nation-state, nationalism, territoriality; Frontiers, boundaries and maritime boundaries: nature, function, classification, hierarchy.

Unit IV: Electoral Geography: types of electoral systems, methods and approaches of studying electoral geography, geographical influence in voting; Geostrategic views of Mahan, Mackinder and Spikeman; conflicts between States: Religious, linguistic, resource sharing disputes, Inter-State boundary disputes etc; conflict resolutions: supra-national organisations, regional associations and their geographical significance.

Reference:

1. Adhikari, S. 1997. *Political Geography*, Rawat publications, Jaipur and Delhi.
2. Agnew, J. (ed.), 1997: *Political Geography*, Arnold, London
3. Ahmad A (1993) (ed) Social Structure and regional Development: A Social Geography Perspective, Rawat Publications, Jaipur.
4. Ahmed A (1999) Social Geography, Rawat publications, Jaipur.
5. Blake, G. (ed.), 1987: *Maritime Boundaries and Ocean Resources,* Croom Helm, London.
6. Bryant, R. L. and Bailey, S., 1997: *Third World Political Ecology*, Routledge, London.
7. Crane Robert, I. 1973. *Regions and Regionalism in South Asian Studies: An Exploratory Study*, Duke University Durham.
8. Dikshit, R. D., 1997: *Developments in Political Geography: A Century of Progress,* Sage Publications, New Delhi.
9. Dodds, K., 2000: *Geopolitics in a Changing World*, Prentice Hall, Essex.
10. Dutt NK.,(1986), *Origin and Growth of Caste in India*, Firma Kin, Calcutta
11. Elliott, L., 1998: *Global Politics of the Environment*, Macmillan Press Ltd., London.
12. Khubchandani ML, (1988) *Language in a Plural Society*, Indian Institute of Advanced Study, Shimla.
13. Kosambi DD (1962) Myth and Reality: Studies in the Formation of Indian Culture, Popular Prakashan, Bombay.
14. O'Tuathail, G. and Simon, D., 1998: *Rethinking Geopolitics,* Routledge, London.

15. Pain R, M. Barke, D Fuller, J Gough, R MacFarlane, G Mowl, (2001), *Introducing Social Geographies,* Arnold Publishers, London.
16. Parker, G., 1998: *Geopolitics: Past Present and Future,* Printer, London.
17. Raza, M. and Ahmed, A. 1990. *An Atlas of Tribal India*, Concept Publishing Co, Delhi.
18. Sopher, D. (ed.) 1980. *An Exploration of India: Geographical Perspectives on Society and Culture*, Cornell Press, New York.
19. Taylor, P.J. and Johnston, R.J., 1979: *Geography of Elections,* Croom Helm, London.
20. Taylor, P.J., 2000: *Political Geography: World Economy, Nation-State and Locality*, Longman, London.

GEOGRAPHY OF NORTH EAST INDIA AND TRIPURA
Paper Code: GEDM 805E

Credit: 04 **No. of Periods: 72**
Marks: 100

Group A: Geography of North East India

Unit I: **Physical Environment and related hazards:** Geology, Physiography, Drainage, Climate, Soil and Natural Vegetation; Natural hazards

Unit II: **Population and resources (State wise):** Population Growth and Distribution; Population density: Rural and Urban scenario; Population migration: Emerging Problem; Water Resources: Potentiality and Use; Sustainable Use of Forest Resources; Mineral Resources: Potentiality and Use; Management of Resources: geographical Issues and Challenges

Group-B: Geography of Tripura

Unit III: **Physical Environment and related hazards:** Geology, Physiography, Drainage, Climate, Soil and Natural Vegetation; Natural hazards.

Unit IV: **Economic Development**: Distribution and Use of Forest, Water and Mineral Resources; Agricultural Development: Sedentary and Shifting Cultivation, Productivity and Output of Major crops –Rice, Oil seeds, Potato and Plantation Crops-Tea and Rubber; Industrial Development: Constraints and Future Prospects; Transport and Communication

References:

1. Taher, M. and Ahmed, P. (2001): Geography of North-East India, Moni Manik Prakash, Guwahati, Assam.
2. Bhattacharya, N.N. (2009): North Eash India: A Systematic Geography, Rajesh Publications, New Delhi.
3. Devee, G. and Das, P. (2018): North East India: A Comprehensive Geography, Eastern Book House, Guwahati, assam.
4. Bhowmik, I. and Chakraborti, D. edited (2011): Resources & Economy of Tripura, Eastern Book House, Guwahati, Assam.
5. Dikshit, K. R. and Dikshit, J.K. (2013): North-East India: Land, People and Economy; Springer Publication.

SOIL AND BIOGEOGRAPHY
Paper Code: GEDM-806E

Credits: 04 **No. of Periods: 72**
Marks: 100

Group A: Soil Geography

Unit I: Soil Forming Process and types: Factors of Soil Forming; Soil profile development of Podzol, Laterite and Chernozem; Genetic System of Classification; Modern System of Classification; Major Soil Groups of India.

Unit II: **Soil and Environmental Problems**: Soil pollution, Soil erosion and Environmental degradation; Shifting cultivation and Problem of soil erosion; USLE & RUSLE model for estimation of Soil loss; Sustainable use of soil resource.

Group B: Biogeography

Unit III: Meaning, scope and development of Biogeography; Factors affecting distribution and dispersal of plants and animals; Habitat factors and adaptation of plants in Mountain, grassland, Wetland and Coastal ecosystems; Factors of biodiversity loss.

Unit IV: Issues and strategies of conservation of forest and wildlife; Conservation of forests, Afforestation, Agro-forestry, Social forestry.

References:

1. Joffe, Jacob Samuel (1949): The ABC of soils, New Brunswick.
2. Biswas, T.D. and Mukherjee, S.K. (1987): Textbook of Soil Science, Tata-MCGraw-Hill.
3. Morgan, R.P.C. (1995): Soil Erosion and conservation, Longman.
4. Bridges, E.M. (1986) : Principles and applications of Soil Geography, Halsted Press.
5. Daji, J.A. (1970): A Text book of Soil Science, Asia Publishing House.
6. Cox, C.B and Moore, P.D. (2000*): Biogeography - An Ecological & Evolutionary Approach*. Blackwell Science Ltd, Oxford, London.
7. Mathur, H. S. (2003): *Essentials of Biogeography*. Pointer Publishers, Jaipur.
8. Pears, N. (1977): *Basic Biogeography*. Longman Group, London.
9. Robinson, H. (1972): *Biogeography*. MacDonald and Evans, London.
10. Seddon, B. A. (1971): *Introduction to Biogeography*. Gerald Duckworth and Co., London.
11. Sharma, P.D. (1996): *Ecology and Environment*. 7th Edition, Rastogi Publications, Meerut.
12. Tivy, J. (1993): *Biogeography: A Study of Plants in the Ecosphere*. Longman, London.

GEOGRAPHY OF TOURISM

Paper Code: GEDM 807E

Credits: 04 **No. of Periods: 72**
Marks: 100

Unit I: Introduction of Tourism: Nature, Scope, Forms and Pattern; Key Controlling Factors (KCFs); Types of Tourism; Contemporary Philosophy and Practices.

Unit II: Tourism Policy and Development in India: Tourism Policy in India; Description of the Dynamic, Interactive and Complex Nature of Tourism Policy and Planning; Policy Intervention and Impact: Foreign Direct Investment (FDI), PPP Model, SCOT Model, PEST Model.

Unit III: Tourism Planning and Strategy: Assessment and Evaluation of Tourism Plan; State wise Feasibility Study of a Tourism Plan; Project Work: Case study of Tripura.

Unit IV: Tourism Management: Investment opportunities and Tourism Resource (AAA Model) for Tourism Industry; Demand Analysis of Tourism Industry: Law of Demand, Exceptions to the law of Demand, Determinants of Demand; Tourism Marketing: Product, Price, Place and Promotion (4Ps Model); Tourism and Economic Development; Tourism Management.

Reference

1. Chaudhary, M. (2010). Tourism Marketing. New Delhi: Oxford University Press.
2. Choudhury, V. (2010). Tourism Planning and Management. New Delhi: Anmol Publications Pvt.Ltd.
3. Fayos-Solà, E., & Cooper, C. (2019). The Future of Tourism: Innovation and Sustainability. Switzerland: Springer International Publishing.
4. George, B. (2018). Advancements in Tourism Theory and Practice. New Delhi: Abhijeet Publications.
5. Lohmann, G., & Panosso, N. A. (2018). Tourism Theory: Concepts, Models and Systems. Brisbane: CABI.
6. Mason, P. (2003). Tourism Impacts, Planning and Management. Oxford: Taylor & Francis Ltd.
7. Nelson , V. (2013). An Introduction to the Geography of Tourism. Houston: Rowman & Littlefield Publishers.
8. Powell, T. (2013). International Tourism: Planning and Management. New York: Clanrye International.
9. Varma, J. K., & Mishra, P. K. (2018). Tourism in India:Potential, Problems and Prospects. New Delhi: New Century Publications.
10. William, S. W. (2002). Tourism Geography. London: Routledge.

Semester - III

HAZARD AND DISASTER MANAGEMENT
Paper Code: GEDM 901C

Credits: 04 **No. of Periods: 72**
Marks: 100

Unit I: Natural hazards and disasters: Geological hazards- Volcanic eruption, Earthquakes-tsunami, Landslides, Mudflow; Cryospheric hazards- Melting of snow, Avalanche, Glacial Lake Outburst Floods (GLOF); Meteorological hazards- Tropical Storm, Extra-tropical storm, Cyclone; Hydrological Hazards-Floods, Flash flood and cloud burst, Drought, Storm surge; Climatological Hazards-Cold and heat Waves, Wildfire; Geomorphic hazards- River bank erosion, Coastal erosion, Biophysical Hazards-Epidemics, Insect infestation.

Unit II: **Anthropogenic hazards and disasters**: Technological Hazards-Chemical spill from industries, Explosion from nuclear power plants, Nuclear radiation, Engineering failure; Social violence hazards-Crime, Civil disorder, Terrorism, Political hazards- War, Massacre; Transport hazards- Railways, Roadways; Biological Hazards-Biological warfare, Bioterrorism; Global issues-economic recession/crisis.

Unit III: Management of natural hazards and disasters: Disaster Mitigation, Preparedness, Response and Recovery in case of Geological, Cryospheric, Meteorological, Hydrological, Climatological and Geomorphic disasters.

Unit IV: Management of anthropogenic hazards and disaster: Disaster Mitigation, Preparedness, Response and Recovery in case Geological, Technological, Social, Political, Transport, Economic recession disasters.

References:

1. Alexander, D. (1993): *Natural Disasters*. Springer, Berlin.
2. Goudie, A.S. (2013): *The Human Impact on the Natural Environment*. Wiley-Blackwell, Oxford.
3. Hart, M. G. (1986): Geomorphology: Pure and Applied, George Allen and Unwin, London
4. Kusky, T. (2012): *Encyclopedia of the Hazardous Earth*. Viva Books, New Delhi.
5. Pandey, M. (2014): *Disaster Management*. Wiley, New Delhi.
6. Sharma, R.K., and Sharma, G. (2005): *Natural disaster*. APH Publishing Corporation, New Delhi.
7. Singh, R.B. (2006): *Natural Hazards and Disaster Management*. Rawat Pub., New Delhi.
8. Singh, S. (2000): *Environmental Geography*. Prayag Pustak Bhavan, Allahabad.
9. Singh, S. and Singh, J. (2013): *Disaster Management*. Pravalika Publications, Allahabad.
10. Smith, K. (1996): *Environmental hazards: assessing risk and reducing disaster*. Routledge, London.
11. Turk, J. (1985): Introduction to Environmental Studies, Saunders College Pub., Japan
12. Valdiya, K. S. (1987): Environmental Geology, Tata McGraw Hill, New Delhi
13. Wisner, B., Gaillard, J.C., and Kelman, I. (2012): *Handbook of Hazards and Disaster Risk Reduction*. Routledge.

PHILOSOPHY OF GEOGRAPHY
Paper Code: GEDM 902C

Credits: 04 **No. of Periods:72**
Marks: 100

Unit I: Evolution of Geographical Thought: Geographical Concept in Ancient India, Greek, Roman and Medieval Period; Changing Paradigm; Spatial Organization; Areal Differentiation; Impact of Explorations Discoveries. European Renaissance; Geography as an Integrating Science. Progress and Contribution in Indian Geography

Unit II: Dualism in Geography: Systematic and Regional, Physical and Human, Idiographic and Nomothetic and Determinism and Possibilism

Unit III: **Philosophical debates in Contemporary Geography:** Positivism, Structuralism, Post Structuralism, Behaviouralism, Realism, Marxism, Radicalism Geography, Post Modernism

Unit IV: Geographical Analysis and future of Geography: Epistemology of Geography, Quantitative and Qualitative, Field Geography and Cartography, Changing Nature, Concepts, Approaches, and Methodologies of Geography in a Globalized world.

References

1. Bowen, M. (2009). Empiricism and Geographical Thought: From Francis Bacon to Alexander Von Humbolt. United Kingdom: Cambridge University Press.
2. Brooks, C., Butt, G., & Fargher, M. (2017). The Power of Geographical Thinking. Germany: Springer International Publishing.
3. Dikshit, R. D. (2001). Geographical Thought: A Contextual Histotry of Ideas. New Delhi: Prentice Hall of India Pvt. Ltd.
4. Harvey, D. (1989). Explanation in Geography. Bangalore: Arnold Publishers.
5. Husain, M. (2016). Evolution of Geographical Thought. Jaipur: Rawat Publications.
6. Merrills, A. H. (2005). History and Geography in Late Antiquity. (n.p.): Cambridge University Press.
7. Onokerhoraye, A. G. (1994). Geographic Thought, Philosophy and Methodology. Nigeria: University of Benin.
8. Peet, R. (2011). Modern Geographical Thought. New Delhi: Rawat Publications.
9. Turner, A. (2006). Introduction to Neogeography. United States: O'Reilly Media.

RESEARCH METHODS AND TECHNIQUES IN GEOGRAPHY
Paper Code GEDM:903C

Credits: 04 **No. of Periods: 72**
Marks: 100

Unit 1: Introduction to Geographical Research: Meaning and definition, objectives, types and approaches to Research in Geography; Criteria of good research, Research problems faced by the researchers in India. Research ethics, Review of literature, Need for review of literature.

Unit II: Forms of Research: What is research problem, selecting the research problem, Necessity of defining the problem; Research design: Meaning, Important concepts relating to research design, different research designs, Developing a research plan and making questionnaire; Hypothesis.

Unit III: Data Sources and Methods of Data Collection: Nature of data: Qualitative and quantitative, Primary Data: Field survey, Selection of sample, Questionnaire, Interview, Observation, PRA; Secondary Data; Sampling methods: Need for sampling, definitions, sampling theory

Unit IV: Data Analysis: Processing of data; tabulation, graph presentation and analysis of data; referencing; Structure of dissertation.

References:

1. Ahuja, R. (2001): Research Methods, Rawat, New Delhi.
2. Bhattacharyya, D. K. (2005): Research Methodology, Excel Books, New Delhi
3. Blaxter, L., Hughes, C. and Tight, M. (1996): How to Research. Open University Press, Buckingham.
4. Crang, Mike 1999. Cultural Geography. Routledge, London.
5. Clifford, N.J. and G. Valentine 2003: Key methods in Geography, Sage, London.
6. Daniels, P., Bradshaw, M., et al. (2000): Human Geography: Issues for the 21st Century. Prentice Hall, London, Indian reprint, 2003.
7. Dikshit, R. D. (2003): The Art and Science of Geography: Integrated Readings. Prentice-Hall, New Delhi.
8. Dorling, D. and Simpson, L. (ed.) (1999): Statistics in Society. Edward Arnold, London.
9. Eyles J. and Smith D. M. (1988): Qualitative Methods in Human Geography, Polity Press, Cambridge.
10. Fisher, P. and Unwin, D., (ed.) (2002): Virtual Reality in Geography. Taylor & Francis, London.
11. Flowerdew, R. and Martin, D. (ed.) (1997): Methods in Human Geography: A Guide for Students Doing a Research Project. Longman, Harlow.
12. Gomez, B. and Jones, J. P. III (2010): Research Methods in Geography: A Critical Introduction, John Wiley, New York. 26
13. Hay, I. (ed.) (2000): Qualitative Research Methods in Human Geography. Oxford University Press, New York.
14. Kitchin, R. and Tate, N., (2001): Conducting Research into Human Geography. Theory, Methodology and Practice. Prentice-Hall, London.
15. Montello, D. and Sutton, P. (2013): An Introduction to Scientific Research Methods in Geography and Environmental Studies, SAGE Publications.

SURVEY AND FIELD REPORT (Practical)
Paper Code: GEDM 904C

Credits: 05
Marks: 100

(Group-A)
SURVEY

Marks: 50 **No. of Periods: 45**

Unit I: Basic Concept of Surveying: Concept, Significance, Tools & Techniques related to different Survey.

Unit II: Prismatic Compass Survey & Dumpy Level Survey: Contouring and Determination of Land Profile: Open Traverse, Closed Traverse & interpretation.

Unit III: Theodolite Survey: Determination of Hight & Distance of an Object & Preparation of a Map/ Plan: Intersection Method & Tacheometric Method & interpretation.

Unit IV: GPS Survey: Spatial Data Collection using Handheld GPS Receiver, Data Computation, Map Preparation & Interpretation.

References:

1. Basak, N. N. (2014). Surveying and Levelling. India: McGraw Hill Education.
2. Bhavikatti, S. S. (2010). Surveying and Levelling. India: I.K. International Publishing House Pvt. Ltd.
3. Chandra, A. M. (2011). Surveying. India: McGraw-Hill Education (India) Pvt. Limited.
4. Ghosh, J. K. (2015). A Text Book on GPS Surveying. India: CreateSpace Independent Publishing Platform.
5. Kanetkar, T. P., & Kulkarni, S. V. (1991). Surveying & Levelling. Pune: Pune Vidyarthi Griha Prakashan.
6. Leick, A., Rapoport, L., Tatarnikov, D. (2015).GPS Satellite Surveying. Germany: Wiley.
7. Roy, M., & Russell, C. B. (1995). The Surveying Handbook. Netherlands: Chapman & Hall.

(Group-B)

FIELD REPORT

Marks:50

Students are required to prepare a field report of about 50 to 75 pages based on scientific excursion organized by the department.
Field Report (35), Field Assessment/ Performance/ Internal Assessment (15)

NATURAL RESOURCE MANAGEMENT
Pape Code: GEDM 905E

Credit: 04 **No. of Periods: 72**
Marks: 100

Unit I: Concept and Classification of Resources; Meaning of resource and Changing concept; Classification of Resources: Bases of Classification and Classification Schemes, World resources: distribution and pattern; Land, water, mineral and power resources, Global trend of Resource studies with special reference to Sustainable Development Goal

Unit II: Natural Resources

Population Growth and Natural Resource Use; Major Natural Resources: Distribution and Availability/ Production of Land, Forest, Water, Energy and Marine Resources in India; Resource Use in North-east India; Major Resource Regions of India

Unit III: Conservation and Management of Resources

Concept and Importance of Conservation and Management of Resources; Conservation of Renewable and Non-renewable Resources; Management of Human Resources

Unit IV: Governance

Resource Conservation Policies: Global and regional; Planning and institutional advancement in natural resource management; Role of local self -governance in the management and conservation of natural resources

References:

1. Burton, I. and Kates, R.W. (1978): Readings in Resource Management and Conservation, McGraw Hills, New York
2. Clark, G. L., Feldman, M.P. and Gertler, M.S. (eds.) (2000): The Oxford Handbook of Economic Geography. Oxford University Press, Oxford and New York.
3. Ehrlich, P.R., Ehrlich, R.H. and Holdren, J.P. (1998): Ecoscience: Population, Resources and Development. 2nd edition. Freeman and Company, San Francisco.
4. Sheppard, E. and Treror, I. B. (ed.) (2003): A Companion to Economic Geography, Blackwell Publication, U.K. and USA.
5. McCarty, H.M. and James, B.L. (1976): A Preface to Economic Geography. Prentice Hall, New Jersey.
6. Mitra, A. (2000): Resource Studies; Shridhar Publishers., Kolkata.
7. Ramesh, A. (ed.) (1984): Resource Geography. Heritage Publishers, New Delhi.
8. Singh, J. (2000): Sansadhan Bhoogol, Gyanodaya Prakashan, Gorakhpur
9. Singh, K.N. and Singh, J. (2003): Arthik Bhoogol Ke Mool Tatva, Gyanodaya Prakashan, Gorakhpur.
10. Todaro, M.P. and Smith, S.C. (2004): Economic Development, Pearson Education, (Singapore) Private Ltd. Singapore

HDROLOGY AND WATER RESOURCE MANAGEMENT
Paper Code: GEDM-906E

Credits: 04 **No. of Periods: 72**
Marks: 100

Unit I: Hydrology: Meaning and scope of Hydrology, Hydrological cycle; Man's influence on the hydrological cycle; Precipitation types, characteristics and measurements; Interception; Evaporation: factors affecting evaporation from free water surface and soil; Evapotranspiration: estimation and its control.

Unit II: Surface Water Hydrology: River basin and problems of regional hydrology, sources of streamflow, streamflow hydrograph, streamflow measurement, rainfall-runoff relationship, flow duration curve, surface water resource of India, wetland hydrology.

Unit III: Groundwater Hydrology: Classification of subsurface water, formations according to their water-bearing properties, types of aquifer and aquifer properties, Darcy's law and elementary groundwater flow equation, geological formations as aquifers, groundwater monitoring, groundwater resource estimation.

Unit IV: Contemporary Issues and Challenges: Drought, flood, water use conflicts, water quality and major water pollutants (points and non-point source), water quality criteria for different uses; Water Resource Planning; Management and Policy: Water resources management (demand and supply side), Watershed management, water harvesting, National water policy.

References:

1. Abbas, B.M. (1982): The Ganges Water Dispute, Vikas Publishing House, New Delhi.
2. Aggarwal, A. (1991): Floods, Floodplains and Environmental Myths, Centre for Science and Environment, New Delhi.
3. Andrew. D.W. and Stanley, T. (2004): Environmental Hydrology, 2nd edition, CRC Press, Allahabad.
4. Bhattacharya, S.K. (1988): Urban Domestic Water Supply in Developing Countries, CBS Publishers & Distributors, Delhi.
5. Bilas, R. (1988): Rural Water Resource Utilization and Planning. Concept, New Delhi.
6. Brutsaert, W. (2005): Hydrology: An Introduction, Cambridge University Press.
7. Davie, T. (2008): Fundamentals of Hydrology, Routledge, London.
8. Karanth, K.R. (1988): Ground Water: Exploration, Assessment and Development, Tata-McGraw Hill, New Delhi.
9. Mahajan, G. (1989): Evaluation and Development of Groundwater, Ashish Publishing House, New Delhi.
10. Palanisami, K. (1984): Integrated Water Management: The Determinants of Canal Water Distribution in India: A Micro Analysis, Aricole, New Delhi. 24
11. Rai, V.K. (1993): Water Resource Planning and Development, Deep & Deep Publication, New Delhi
12. Ramaswamy, C. (1985): Review of floods in India during the past 75 years: A Perspective. Indian National Science Academy, New Delhi.
13. Rao, K.L. (1982): India's Water Wealth, 2nd edition, Orient Longman, Delhi,.
14. Reddy, J.P. (1988): A Textbook of Hydrology. Laxmi Publication, New Delhi.
15. Singh, M.B. (1999): Climatology and Hydrology. Tara Book Agency, Varanasi. (In Hindi).
16. Singh, V.P. (1995): Environmental Hydrology, Kluwar Academic Publications, The Netherlands.
17. Todd, D.K. (1980): Groundwater Hydrology. John Wiley, New York.
18. Ward, R.C. and Robinson, M. (2000): Principles of Hydrology. McGraw Hill, New York.
19. Warren Viessman Jr. and Gary L. Lewis, (2002): Introduction to Hydrology, Prentice Hall, New York

URBAN GEOGRAPHY
Paper Code: GEDM 907E

Credit: 04 **No. of Periods:72**
Marks: 100

Unit I: Urban Geography and Urbanization

Concept, Scope, Function, Approach and Significance of Urban Geography; Concept, Process and Measurement of Urbanization, Theoretical and Methodological Approaches of Urbanization, Urban System: Evolution, Growth, Primacy, Hierarchy.

Unit II: Urban Space

Urban Space; Urban Morphology: Urban Land Use and Economies of Land Use Change; Functional Classification of Harris, Nelson and McKenzie, Henri Lefebvre; Process of Sub-urbanization, Peri-urban interface: Critical issues; Urban renewal: Gentrification, Revanchism.

Unit III: Urban Infrastructure

Urban Social Structure: Forms, Behaviour, Transformation; Urban Economy: Production, Market, Urban Infrastructure: Housing, Transport, Energy, Drinking Water, Drainage, Urban Waste; Urban Environment: Air, Water, Noise, and related issues; Empirical Analysis of Urban Infrastructure.

Unit IV: Urban Policy and Regeneration

Urban Planning Policy in India; Metropolitan Planning of India; Master Plan Analysis: Case Studies of Delhi, Mumbai and Kolkata; Integrated Development of Small and Medium Towns (IDSMT); National Urban Renewal Mission; New Towns; Impact of LPG on Indian Urbanization.

References

1. Couch, C. (2016). Urban Planning: An Introduction. Liverpool: Palgrave.
2. Dalla Longa, R. (2011). Urban Models and Public-Private Partnership. Germany: Springer Berlin Heidelberg.
3. Goel, S. L. (2002). Urban Development and Management: In Indian Context. New Delhi: Praeger.
4. Hall, T., & Barrett, L. (2012). Urban Geography. London: Routledge.
5. Holwitt, P. (2020). Urban Renewal in India. New Delhi: Roudledge.
6. Latham, A., McCormack , D., McNamara, K., & McNeill , D. (2008). Key Concepts in Urban Geography. New York: SAGA.
7. Ramachandran, R. (1992). Urbanisation and Urban Systems in India. New Delhi: OUP India.
8. Rao, V. P. (2013). Urbanisation in India: Spatial Dimension. New Delhi: Concept Publishing Company Pvt. Ltd.
9. Short, J. R. (2017). An Introduction to Urban Geography. London: Routledge.
10. Weber, R., & Crane, R. (2012). The Oxford Handbook of Urban Planning. London: Oxford University Press.
11. Yadav, C. S. (1986). Models in Urban Geography. India: Concept Publishing Company.

Semester -IV

FLUVIAL GEOMORPHOLOGY (Special Paper Theoretical)
Paper Code: GEDM 1001C (1)

Credit: 04 **No. of Periods: 72**
Marks: 100

Unit I: Stream denudation: Variability in denudation rate- Effect of climate, Influence of elevation & relief, Effect of man ; Hydraulics of Stream flow: Factors influencing hydraulics of flow; Types of flow; Stream energy; Roughness; Turbulence ; Entrainment & Transport: Conditions of entrainment-Critical shear stress, Critical velocity; Lift & drag forces, Bedload, Suspended load

Unit II: River Morphology: Controls on morphology of a reach; Channel pattern – Meanding, Meander geometry, Hydraulics of flow at meander bends, Meandering & Stream energy, Incised meanders; Braided pattern- Morphology & hydraulics, Influence of discharge, Braided channel bars, Braiding & sediment load.

Unit III: Erosional & depositional landforms; Structural & lithological control over drainage.

Unit IV: Impact of man on rivers: General effects on hydrology, Hydrologic effects of urbanization, Land use change & sediment yield, Urbanization and Channel enlargement, Effect of dams.

References:

1. Devi, H.I. (2000): River Basin Morphology, Rajesh Publications, New Delhi.
2. Raghunath, H.M. (2006): Hydrology: Principles, Analysis, Design, New Age International, New Delhi.
3. Sen, P.K. (1993): Geomorphological analysis of drainage basins, The University of Burdwan, Barddhaman, West Bengal.
4. Leopold, L.B., Wolman, M.G. and Miller, J.P. (1964): Fluvial Processes in Geomorphology, S. Chand and Company Ltd., New Delhi.
5. Morisawa, M. (1968): Streams: Their dynamics and Morphology, McGraw Hills Book Co.
6. Morisawa, M. (1985: Rivers, Form and Process, Longman, London.
7. Mukhopadhyay, S. and Mukhopadhyay, M. (1991): River Geography, IPP.
8. Singh, S. (1998): Geomorphology, Prayag Pustak Bhawan, Allahabad.
9. Selby, M.J. (2005): Earth's Changing Surface, Oxford University Press, [Indian Edition].
10. Knighton, D. (1998): Fluvial Forms and Processes: A New Perspective, Hodder Education, UK.
11. Thornbury W.D. (1984): Principles of Geomorphology, 2nd Edition, Wiley Eastern Ltd., New Delhi.

FLUVIAL GEOMORPHOLOGY (Special Paper Practical)
Paper Code: GEDM 1002C (1)

Credit: 05 **No. of Periods: 90**
Marks: 100

Unit I: Drainage analysis of a drainage basin: Spatial distribution of Drainage frequency, Drainage density; Drainage pattern; Stream order, Stream number, Stream length, Bifurcation ratio, Stream length ratio, Relief ratio, Elongation ratio, Circularity ratio, Sinuosity index, Drainage density, Stream frequency, Longitudinal profile & fitting of exponential curve, Cross valley profile.

Unit II: Relief analysis of a drainage basin: Spatial distribution of Absolute relief, Relative relief, Dissection index, Hypsometric curve, Altimetric frequency histogram & curve; Landscape profile: Serial, Superimposed, Composite & Projected; Erosion surfaces.

Unit III: Slope analysis of a drainage basin: Average slope after Wentworth, Areal distribution of slope categories, Correlation between slope and Absolute relief and Relative relief; Field measurement of river bank angle; Temporal change in river bank angle; Calculation of stream gradient.

Unit IV: Construction and interpretation of Rating curve and Hydrograph; Identification of water discharge for 50 and 100 years return period, Spatial-temporal change in river plan form.

Laboratory Note Book and Viva voce

References:

1. Devi, H.I. (2000): River Basin Morphology, Rajesh Publications, New Delhi.
2. Singh, C.P. (2002): Applied Geomorphology: A study, B.R. Publishing Corporation, Delhi.
3. Reddy, P.J.R. (2006): A Text book of Hydrology, Laxmi Publications (P) Ltd, New Delhi.
4. Raghunath, H.M. (2006): Hydrology: Principles, Analysis, Design, New Age International, New Delhi.
5. Sen, P.K. (1993): Geomorphological analysis of drainage basins, The University of Burdwan, Barddhaman, West Bengal.

DISSERTATION
Paper Code GEDM:1003C (1)

Credit: 06
Marks: 100

4th Semester M.A/M.Sc in Geography and Disaster Management students should select a specific topic for dissertation with the consultation of the allotted supervisor. The dissertation should be under the following heads:

A. Title of the project
B. Introduction
C. Statement of problem
D. Review of Literature
E. Study Area
F. Objectives
G. Research Methodology
H. Results & Discussion
I. Conclusion
J. References
K. Field Photos

Evaluation Scheme:

A. Statement of problem - 02 Marks
B. Review of Literature - 05 Marks
C. Study Area with location map - 05 marks
D. Objectives - 03 Marks
E. Research Methodology - 05 Marks
F. Results and Discussion - 10 Marks
G. Conclusion - 05 Marks
H. References - 03 marks
I. Field Photos - 02 marks
J. Presentation - 15 Marks
K. Viva Voce - 15 Marks

REGIONAL PLANNING AND DEVELOPMENT (Special Paper Theoretical)
Paper Code: GEDM 1001C (2)

Credit: 04 **No. of Periods:72**
Marks: 100

Unit I: Region and Regionalization: Concept, Classification and Delineation of Region; Types of Planning, Model of Planning; Basic Principles of Regional Planning; Concept, Nature and Scope of Regional Planning, Methods and Approaches to Regional Planning. Planning Strategy and Method, Planning Region of India. Measurement of Regional Development, Strategies for Regional Development, Regional and Economic Disparity and Diversity.

Unit II: **Theories and Models for Regional Planning:** Growth Pole Model of Perroux; Growth Centre Model in Indian Context; Myrdal, Hirschman, Rostow and Friedmann; William Alonso, Ebenezer Howard, Lewis Mumford, Patric Geddes, Peter Hall

Unit III: Urban Planning and Development: Concept, Process and Measurement of Urbanization; Social Area Analysis; Factorial Ecology; Industrialization and Urbanization; Urban Planning Policies; Urban Development Programmes in India during Plan Periods; Smart City Concept: Case Study of Agartala City, Urban Planning Governance.

Unit IV: Rural Planning and Development: Rural Planning and Policy; Community Participation; Marginalization and Concepts of Inclusive Planning; Approaches of Rural Development, Strategies for Rural Development, Rural Development Programmes during Plan Period. Case Study on Rural Development initiatives in Tripura; Community Development Approaches; Rural Governance; Rural Planning: GPDP; Rural Habitat Policy– Experiences in Developing Countries Regarding Settlement Structure, Growth and its Spatial Distribution.

References

1. Ray Chaudhuri, J. (2001). An Introduction to Development and Regional Planning: With Special Reference to India. India: Orient Longman.
2. Regional Planning: Concepts, Techniques, Policies and Case Studies. (1992). India: Concept Publishing Company.
3. Glasson, J., Marshall, T. (2007). Regional Planning. United Kingdom: Routledge.
4. Chand, M., Puri, V. K. (1983). Regional Planning in India. India: Allied Publishers.
5. Tewdwr-Jones, M., Hall, P. (2010). Urban and Regional Planning. United Kingdom: Taylor & Francis.
6. Friedmann, J., Weaver, C. (1980). Territory and Function: The Evolution of Regional Planning. United States: University of California Press.
7. Kulshrestha, S. K. (2012). Urban and Regional Planning in India: A Handbook for Professional Practice. India: SAGE Publications.
8. Wong, C. (2006). Indicators for Urban and Regional Planning: The Interplay of Policy and Methods. United Kingdom: Taylor & Francis.
9. Couch, C. (n.d.). Urban Planning: An Introduction. United Kingdom: Palgrave Macmillan.
10. Buch, M. N. (1993). Environmental Consciousness and Urban Planning. India: Orient Longman.
11. Nath, V. (2007). Urbanization, Urban Development, and Metropolitan Cities in India. India: Concept Publishing Company.
12. Ramachandran, R. (1991). Urbanization and Urban Systems in India. India: OUP India.
13. Singh, K. (1999). Rural Development: Principles, Policies and Management. India: SAGE
14. Desai, V. (2005). Rural Development in India: Past, Present and Future: a Challenge in the Crisis. India: Himalaya. Publications.

REGIONAL PLANNING AND DEVELOPMENT (Special Paper Practical)
Paper Code: GEDM 1002C (2)

Credits: 05 **No. of Periods:90**
Marks: 100

Unit I: Regional Concentration and Disparities: Sphere of influence by Gravity Model, Measurement of Inequality by Lorenz Curve, Gini Co-Coefficient, Concentration by Location Quotient, Regional Disparity by Sopher's Method, Kendall's Method, Composite Dimension Index, Synthetic Indicator.

Unit II: Transport and Regional Development: Accessibility by Detour Index, Measurement of Transport Accessibility by Shortest Path Matrix and other indexes. Regional Growth by analysis of Time series data.

Unit III: Regional Growth: Rural-urban growth and differentials, Correlation Analysis and Spatial correspondence, Weighted Score and Combination analysis: Weaver's Method, Ternary Diagram; Principal Component Analysis, Factor Analysis.

Unit IV: Mapping and Regional Analysis: Site Mapping and Planning Proposal using GIS and CAD Technique; Estimation of Plan: Cost Benefit Analysis.

Laboratory Note Book and Viva voce

Reference

1. Babones, S. J. (2013). Methods for Quantitative Macro-Comparative Research. United States: SAGE Publications.
2. Clifford, N (2010). Key Methods in Geography. United Kingdom: SAGE Publications.
3. Czerny, A. (1993). Cartographic Model of Reality: Structure and Properties. Poland: Ossolineum.
4. Domański, R. (1998). Emerging Spatial and Regional Structures of an Economy in Transition. Poland: Wydawn. Naukowe PWN.
5. Getis, A. (2009). Handbook of Applied Spatial Analysis: Software Tools, Methods and Applications. Germany: Springer Berlin Heidelberg.
6. Hammond, R., McCullagh, P. S., McCullagh, P. (1978). Quantitative Techniques in Geography: An Introduction. United Kingdom: Clarendon Press.
7. Khan, N. (1998). Quantitative Methods in Geographical Research. India: Concept Publishing Company.
8. Mahmood, A., Raza, M. (1998). Statistical Methods in Geographical Studies. India: Rajesh.
9. Rogerson, P. A. (2014). Statistical Methods for Geography: A Student's Guide. United Kingdom: SAGE Publications.
10. Wang, F. (2014). Quantitative Methods and Socio-Economic Applications in GIS. United States: CRC Press.

DISSERTATION
Paper Code GEDM:1003C (2)

Credit: 06
Marks: 100

4th Semester M.A/M.Sc in Geography and Disaster Management students should select a specific topic for dissertation with the consultation of the allotted supervisor. The dissertation should be under the following heads:

A. Title of the project
B. Introduction
C. Statement of problem
D. Review of Literature
E. Study Area
F. Objectives
G. Research Methodology
H. Results & Discussion
I. Conclusion
J. References
K. Field Photos

Evaluation Scheme:

A. Statement of problem - 02 Marks
B. Review of Literature - 05 Marks
C. Study Area with location map - 05 marks
D. Objectives - 03 Marks
E. Research Methodology - 05 Marks
F. Results and Discussion - 10 Marks
G. Conclusion - 05 Marks
H. References - 03 marks
I. Field Photos - 02 marks
J. Presentation - 15 Marks
K. Viva Voce - 15 Marks

TRANSPORT GEOGRAPHY (Special Paper Theoretical)
Paper Code GEDM: 1001C (3)

Credit: 04 **No. of Periods: 72**
Marks: 100

Unit I: Transport Geography

`Concept and dimensions of transport geography; Transportation and space; different Sapproaches to transport geography, recent trends; Transport economics; Structural Analysis of Transport Network: spatial interconnection; Transport supply and demand; Transport models: Spatial interaction and regional flow, allocation models.

Unit II: Transport Infrastructure and Trade

Importance of different transport modes: mass transport, MRTS, role of intermediary transport modes; intermodal transportation and modal split; Public and private transport system; Transport terminals; Transportation and Trade: Global patterns, freight transport and commodity chains

Unit III: Urban Transportation and Environmental challenges

Urban transport system and design, Urban land use models; Urban mobility with special emphasis on north-east India; Energy consumption in transport; Issues associated with urban transport: accidents and congestion, Transport and environment: emission, noise, land take;

Unit IV: Transport Planning and Policy

Approaches to sustainable transport planning; National Transport Policy, NHDP; Transport planning in India – roadways, railways, waterways; Regional transport planning with special reference to Tripura: traffic generation, zonal interchange of traffic, mode and route assignments.

References:

1. Ashton, W.D., 1966. The Theory of Traffic Flow, Methuen , London
2. Berry, B.J.L et al., 1966. Essays on Commodity Flow and Spatial Structure of Indian Economy, Department of Geography, Chicago.
3. Berry, B.L.J. and Marble, D.F. (eds.) 1967. Spatial Analysis: A Reader in Statistical Geography, Prentice Hall.
4. Haggett, P. 1965. Locational Analysis in Human Geography, London.
5. Haggett, P. and Chorley, R.J. 1969. Networks Analysis in Geography, London.
6. Hensher,D.A., Button, K.J., Haynes, K.E., Stopher, P.R. 2004, Handbook of Transport Geography and Spatial Systems, Emerald Group Publishing Limited
7. Hoyle, B.S and Knowles, R.D. 1992. Modern Transport Geography, Belhaven press
8. Hurst, M.E. (ed.) Transportation geography: Comments and Reading, McGraw Hill.
9. Kansky, K.J., 1963. Structure of Transportation Networks: Relationships between Network Geometry and Regional Characteristics, University of Chicago, Department of Geography, Research Paper, Chicago, 84.
10. Nagar, V.D. and Gautam S. 1964. Principles and Problems of Indian Transport, Kailash Pustak Sadan, Gwalior.

11. Owen, W. 1968. Distance and Development: Transport and Communications in India, Washington.
12. Raza, M. and Aggarwal, Y. 1986. Transport Geography of India, Concept Publishing Company, New Delhi.
13. Rodrigue,J., Comtois, C. and Slack, B. 2006. The Geography of Transport Systems, Routledge, London and New york
14. Singh, Mohan. 2011. Transport Geography, ABD Publishers, New Delhi.
15. Saxena, H.M. 2005. Transport Geography, Rawat publications
16. Taaffe, E. J., & Gauthier, H. L. (1973). Geography of Transportation. Prentice Hall, New York.
17. White, H. P. and Senior, M.L. 1983. Transportation Geography, Longman Inc. New York.

TRANSPORT GEOGRAPHY (Special Paper Practical)
Paper Code GEDM: 1002C (3)

Credits: 05 **No. of Periods: 90**
Marks: 100

Unit I: Network as a graph: concept of topology, diameter, cyclomatic number, pi, eta, theta, beta, alpha and gamma index; Direct connectivity

Unit II: Measures of Accessibility: Detour Index, Shimbel index; Spatial interaction: OD matrix, Hub-and-spoke networks, Gravity model and Breaking point analysis

Unit III: Correlation and bivariate analysis; residual mapping; Gini Coefficient; Land use modelling: Lowry model

Unit IV: Delphi forecasting; Traffic counts and traffic surveys; Measurement of emission and noise; Transport networking with help of computer application and GIS: service area, route assignments.

Laboratory Note Book and Viva voce

References:

1. Berry, B.J.L et al., 1966. Essays on Commodity Flow and Spatial Structure of Indian Economy, Department of Geography, Chicago.
2. Berry, B.L.J. and Marble, D.F. (eds.) 1967. Spatial Analysis: A Reader in Statistical Geography, Prentice Hall.
3. Haggett, P. 1965. Locational Analysis in Human Geography, London.
4. Haggett, P. and Chorley, R.J. 1969. Networks Analysis in Geography, London.
5. Hoyle, B.S and Knowles, R.D. 1992. Modern Transport Geography, Belhaven press
6. Kansky, K.J., 1963. Structure of Transportation Networks: Relationships between Network Geometry and Regional Characteristics, University of Chicago, Department of Geography, Research Paper, Chicago, 84.
7. Rodrigue,J., Comtois, C. and Slack, B. 2006. The Geography of Transport Systems, Routledge, London and New York
8. Sarkar, A. 2013. Quantitative Techniques: Techniques and Presentations, Orient Black Swan, New Delhi
9. Saxena, H.M. 2005. Transport Geography, Rawat publications
10. Taaffe, E. J., & Gauthier, H. L. (1973). Geography of Transportation. Prentice Hall, New York.

DISSERTATION
Paper Code GEDM:1003C (3)

Credit: 06
Marks: 100

4th Semester M.A/M.Sc in Geography and Disaster Management students should select a specific topic for dissertation with the consultation of the allotted supervisor. The dissertation should be under the following heads:

A. Title of the project
B. Introduction
C. Statement of problem
D. Review of Literature
E. Study Area
F. Objectives
G. Research Methodology
H. Results & Discussion
I. Conclusion
J. References
K. Field Photos

Evaluation Scheme:

A. Statement of problem - 02 Marks
B. Review of Literature - 05 Marks
C. Study Area with location map - 05 marks
D. Objectives - 03 Marks
E. Research Methodology - 05 Marks
F. Results and Discussion - 10 Marks
G. Conclusion - 05 Marks
H. References - 03 marks
I. Field Photos - 02 marks
J. Presentation - 15 Marks
K. Viva Voce - 15 Marks

APPLIED STUDIES IN RESOURCE AND ENVIRONMENTAL MANAGEMENT
(Special Paper Theoretical)
Paper Code GEDM: 1001C (4)

Credits: 04 **No. of Periods: 72**
Marks: 100

Unit I: Major Resources with reference to Tripura, Resource Utilization and Scarcity; Global resource crisis with reference to food and energy; Impact of energy production and use on the environment.

Unit II: Use and over-exploitation of forest resource, deforestation, Effect of development of dam on forest and indigenous communities, Social forestry and integrated development programmes, Urban forestry in city planning; Use and over-use of surface and sub-surface water, Rain water harvesting, Integrated Watershed management, Conservation and management of surface and sub-surface water resources.

Unit III: Soil degradation and soil erosion, Land use and environmental problems of soil, Soil conservation strategies and management; Land degradation, Cycle of land degradation, Problems of land use changes, Land use management and planning in India

Unit IV: Concept of Livelihood in the context of Natural Resource Management, Framework for analysis of livelihoods, Technology as a driver of environmental and social changes, Impact of natural resource crisis on the livelihood of indigenous communities; Indigenous approaches/knowledge to environmental resource management, Rural development programmes and schemes for livelihood development in India; Role of corporate social responsibility in rural development; Role of national and international organization in the promotion of sustainable natural resource use and management

References:

1. Agarwal, B. (1997): *Gender, Environment and Poverty Interlinks: Regional Variations and Temporal Shifts in Rural India: 1971-1991*. World Development (Washington DC), 25 (1). Age International.
2. Barrow, C.J. (2005): *Environment Management and Development*. Routledge, New Yyork.
3. Blowfield M, and Murray, A. (2008): *Corporate Social Responsibility: A critical Introduction*. Oxford University Press. USA.
4. Braidotti, R. et al. (1994): *Women, the Environment and Sustainable Development: Towards a Theoretical Systhesis*. Zed Books, UK.
5. Craig, J.R., Vaughan, D.J., and Skinner, B.J. (1996): *Resources of the Earth: Origin, Use, and Environmental Impact*.2nd Edition, Prentice Hall, New Jersey.
6. D. D. Mishra (2012): *Energy, Environment, Ecology and Society*. S. Chand & Company Ltd., New Delhi.
7. Gadgil, M. and Guha, R. (2001): *Ecology and Equity: The use and abuse of nature in contemporary India*. Penguin, Delhi.
8. Gilbert, O. L. (1989): *The Ecology of Urban Habitats*. Chapman and Hall. London.
9. Grey, G.W., and F.J. Denke. (1986): *Urban Forestry*. Wiley Publication.

10. Harikesh, N Mishra. (2014): *Managing Natural Resources- Focus on Land and Water*. PHI Learning Pvt. Ltd., Delhi.
11. Harper, C., Harper, C.L. and Snowden, M. (2017): *Environment and Society: Human Perspectives on Environmental Issues*. Routledge.
12. Heathcote, I.W. (1988*): Integrated Watershed Management: Principles and Practices*. John Wiley and Sons.
13. Kemp, D.D. (1990): *Global Environmental issues: A climatologized approach*. Taylor and Francis, London.
14. Klee, G.A. (1991): *Conservation of Natural Resources*. Prentice Hall Publ. Co., New Jersey. Krishna, S. (2004): *Livelihood and Gender*. Sage, New Delhi.
15. Knight, Richard L. (1995): *A New Century for Natural Resources Management*. Island Press.
16. Konjendijk, et al. (2005) .*Urban Forests and Trees*. Springer.
17. Krishnamoorthy, B. (2009): *Environmental Management*. PHI Learning Pvt. Ltd., Delhi.
18. Malhotra, KC and Prodyut Bhattachrya. (2010): *Forest and Livelihood*. Pub. Centre for Economic and Social Studies. Hyderabad.
19. Mehta T., Khanna L.S. (1981): *Handbook of Forest Utilization*. Periodical book Agency, Dehra Dun.
20. Miller, R.W. (1997):*Urban Forestry: Planning and Managing Urban Green Spaces*. 2nd Edition, Prentice Hall.
21. Murthy, V.V.N. and M.K. Jha. (2009): *Land and Water Management Engineering*. 5th
22. Edition. Kalyani Publishers.
23. Sanjay, K Agarwal. (2008): *Corporate Social Responsibility in India*. Sage Publication.
24. Owen, O.S., Chiras, D.D. and Reganold, J.P. (1998): *Natural Resource Conservation-Management for Sustainable future*. 7th Edition, Prentice Hall.
25. Sachs, C.E. (2018): *Rural Women, Agriculture, and Environment*. Routledge.
26. Smith, P. And Warr, K. (1991): *Global Environmental Issues*. Hodder and Stoughton, London.

APPLIED STUDIES IN RESOURCE AND ENVIRONMENTAL MANAGEMENT
(Special Paper Practical)

Paper Code: GEDM 1002C (4)

Credit: 05 **No. of Periods: 90**
Marks: 100

Unit-I: Determination of soil pH, Soil salinity and alkalinity; Estimation of NPK from agricultural soil; Physico-chemical characteristics of soil (grain size, porosity, soil moisture estimation, soil organic matter).

Unit-II: Determination of Water quality parameters (Temperature, pH, Alkalinity, Hardness, Iron, Sulphate, Phosphate, DO) from surface and sub-surface sources.

Unit-III: Time series Analysis with environmental data; SWOT Analysis.

Unit-IV: GPS data collection; Remote sensing and GIS application: Mapping of soil erosion based on secondary data, Mapping of surface water quality, Mapping of forest fires, Mapping of landslide prone areas.

Reference:

1. Evangelou, V.P., and Evangelou, V.P. (1998).: Environmental soil and water chemistry: principles and applications. New York: Wiley.
2. Gilbert, R.O. (1987): Statistical methods for environmental pollution monitoring. New York: John Wiley and Sons.
3. Joseph, L. Awange and KyaloKiema .(2013): Environmental Geoinformatics – Monitoring. Springer, 541p.
4. Liu, C., and Evett, J.B. (1984): Soil properties: testing, measurement and evaluation. New Jersey: Prentice Hall.
5. McBeen, E.A. (1999). Statistical Procedures for Analysis of Environmental Monitoring Data.
6. Raghunath, H.M. (2006).Hydrology: Principles, Analysis and Design. New Delhi: New Age International (P) Limited Publishers.
7. Sahu, K.C. (2007): Textbook of remote sensing and Geographical Information Systems. Atlantic Publishers, New Delhi.
8. Smith, K. (2003): Environmental Hazards: Assessing Risk and Reducing Disaster. Routledge.
9. Ward, A.D., and Stanley, T. (2004): Environmental Hydrology. 2nd Edition, Lewis Publishers.
10. Willard, H.H., Merritt Jr, L.L., Dean, J.A. and Settle Jr, F.A. (1988): Instrumental methods of analysis.7th Edition. United States: N. P.Web.
11. Zhu, Zuan. (2016): GIS for Environmental Applications: A Practical Approach. Routledge, Newyork

DISSERTATION
Paper Code GEDM:1003C (4)

Credit: 06
Marks: 100

4th Semester M.A/M.Sc in Geography and Disaster Management students should select a specific topic for dissertation with the consultation of the allotted supervisor. The dissertation should be under the following heads:

A. Title of the project
B. Introduction
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J. References
K. Field Photos

Evaluation Scheme:

A. Statement of problem - 02 Marks
B. Review of Literature - 05 Marks
C. Study Area with location map - 05 marks
D. Objectives - 03 Marks
E. Research Methodology - 05 Marks
F. Results and Discussion - 10 Marks
G. Conclusion - 05 Marks
H. References - 03 marks
I. Field Photos - 02 marks
J. Presentation - 15 Marks
K. Viva Voce - 15 Marks

POPULATION AND RESOURCES (Special Paper Theoretical)
Paper Code GEDM: 1001C (5)

Credits: 04 **No. of Periods: 72**
Marks: 100

Unit I: Components of population change: fertility, mortality, migration; its patterns and trends; implications.

Unit II: Population and resource: population-resource regions, optimum population, over population, under population, land carrying capacity, density of population
Human resources: Measurement, patterns, trends and implications of age groups, age indices, population structure.

Unit III: Distribution and access to resources: gender, location, caste, tribe, ethnicity, religion; Resources and conflicts: global patterns and trends; case study from India in general and North East India in particular

Unit IV: Resource consumption and environment: trend and patterns of resource consumption in developed and developing regions; effects on the environment.

References:

1. Beaujen- Garnier J (1966) Geography of Population; Longman, London.
2. Bhende Asha A and Kanitkar (2002) Principles of Population Studies, 14th Edition, Himalaya Publishing House, Mumbai.
3. Bilasborrow, Richard E and Daniel Hogan, Population and Deforestation in the Humid Tropics, International Union for the Scientific Study of Population, Belguim 1999.
4. Bogua, D. J. Principles in Demography, john Viley, New York 1969.
5. Bose, Ashish el at. : Population in India's Development (1947-2000); Vikas Publishing House, New Delhi 1974.
6. Brock, J.O.M and Welb: Geography of Mankind, McGraw Hill, London 1978.
7. Chandana, R.C. (2002) Geography of Population : Concepts, determination and patterns, Kalyani Publishers, New Delhi.
8. Clarke, J.I. (1992) Population Geography, Second Edition, Pergamon Press, Oxford England.
9. Council for social development (2006) India social development report OUP new Delhi
10. Crook, Nigel Principles of Populations and Development. Pergmaon Press. New York 1997.
11. Daugherty, Helen Gin, Kenneth C. W. Kammeryir, An Introduction to Population (Second Edition) The Guilford Press, New York London 1998.
12. Devaki jain (2005) women development and UN – A sixty years of quest for equality and justice, Indiana university press, USA
13. Domash M et al. (2001) Putting women in place, Gulliford press, New York.
14. Garnier, B. J. Geography of Population Longman, London 1970.
15. Hassan, M.I. (2005) Population Geography, Rawat Publication, Jaipur.

16. Mitra, Ashok India's Population : Aspects of Quality and Control Vol I & II. Abhiman Publications, New Delhi 1978.
17. Newbold Bruce K. (2007) six billion plus: world's population in the 21st century, rowman and little field pub. USA
18. Premi, M.K. (1991) India's Population Heading Towards a Billion, B.R. Publishing Coporation, New Delhi.
19. Ramakumar R (2006) technical demography, new age international New Delhi
20. Saraswati raju et al (1999) atlas of women and man in India, kali for women, New Delhi
21. Sialkind nail J (2006) encyclopedia of human development vol I,II,III sage new York
22. Srinivasan, K. and M. VIassoff, Population Development Nexus in India : Challenges for the New Millennium Lata Mc Graw- Hill, New Delhi 2001.
23. Srinivasn K. Basis Demographic Techniques and Applications Sage Publications, New Delhi 1998.
24. Sundaram K. V. and sudesh Nangia, (ed) Population Geography, Henlage Publilcations, UNDP : Human Development Report, Oxford University Press, Oxford 2000.
25. United Nations, Methods for projections of urban and Rural Population No. VIII, New York 1974.
26. Woods R. Population Analysis in Geography Longman, London 1979.
27. Zelinsky Wilbur, A Prologue to Population Geography, Preglic Hall, 1966.
28. Zukerman Ben at al. (1996) human population and environmental crisis, jone & berlett, boston

POPULATION AND RESOURCES (Special Paper Practical)
Paper Code GEDM: 1002C (5)

Credit: 05 **No. of Periods: 90**
Marks: 100

Unit I: Measures of mortality: disaggregation of mortality rate by age and sex, infant mortality rate, maternal mortality rate Measures of fertility: age specific birth rate, total fertility rate, replacement rate; Measures of migration: in-migration rate, out-migration rate, net migration rate, survival ration methods, age-sex specific net migration, birth place method.

Unit II: Population Distribution: dot maps and sphere, mean centre of population, standard distance from mean centre, location quotient; Population density: arithmetic density, physiological, agricultural, lived density.

Unit III: Population composition: median age, dependency ratio, economic participation measures, sex ratio, population pyramids.

Unit IV: Measurement of inequality: Gini co-efficient, Lorenz curve, gender disparity index, disparity index by Sopher's method.

Laboratory Note Book and Viva voce

References:

1. David M. Smith (1975), Patterns in Human Geography, Penguin, Harmonsworth.
2. Ebdon D (1983) Statistics in Geography: A Practical Approach, Blackewell, London.
3. Fitz, Gomid, B.P.: Science in Geography, Developments in Geographical Method, Oxford University Press.
4. Gregory, S. (1978) Statistical Methods and the Geographer (4th Edition), Longman, London.
5. Gupta, S.P. : Statistical Methods, Sultan Chand and Sons, Latest Edition.
6. Hagget P., Models in Geography.
7. Hammond & Mccullah 1977: Quantitative Techniques in Geography, Clarendon Press, Oxford.
8. Mahmood, Aslam 1971: Statistical Methods in Geographical studies Rajesh Pub., New Delhi.
9. Mathews, J.A. (1987) Quantitative and Statistical Approaches to Geography, Practical Manual, Pergmon, Oxford.
10. Monkhouse, F.J. & H.R. Wilkinson; Maps and Diagrams Mathuen, London.
11. Pal, S.K. (1998) Statistics for Geoscientists; Techniques and Applications, Concept Publishing Company, New Delhi.
12. Peter, J. Taylor (1977), Quantitative Methods in Geography, Houngton Mifflin Company, Boston.
13. Robert Hammond and Patrik Mc. Cullagh (1974), Quantitative Methods in Geography, Clarendon Press, Oxfords.
14. Sarkar, A., Practical Geography
15. Singh, R.L. & P.K. Dutt: Elements of Practical Geography Students triends.
16. Yeates, Mauris (1974), An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York.

DISSERTATION
Paper Code GEDM:1003C (5)

Credit: 06
Marks: 100

4th Semester M.A/M.Sc in Geography and Disaster Management students should select a specific topic for dissertation with the consultation of the allotted supervisor. The dissertation should be under the following heads:

A. Title of the project
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G. Research Methodology
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K. Field Photos

Evaluation Scheme:

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F. Results and Discussion - 10 Marks
G. Conclusion - 05 Marks
H. References - 03 marks
I. Field Photos - 02 marks
J. Presentation - 15 Marks
K. Viva Voce - 15 Marks

WATERSHED MANAGEMENT (Special Paper Theoretical)
Paper Code GEDM:1001C (6)

Credits: 04 **No. of Periods: 72**
Marks: 100

Unit I: Watershed: Concept and significance of watershed; Watershed characteristics: Geomorphology, drainage basin, relief, slope, soils, and channel morphology.

Unit II: Hydrology and soil: Hydrologic cycle, water balance, precipitation, soil and infiltration, interception and evapotranspiration, groundwater, streamflow and runoff; water quality: Physical and chemical, aquatic ecosystems (eutrophication, habitat disturbance); Estimation of soil erosion.

Unit III: Watershed resource appraisal: Issues in water resources: point source pollution, non-point source pollution, erosion, water scarcity, flooding, drinking water protection, wastewater treatment and septic systems

Unit IV: Watershed management and planning: Objectives, Integrated watershed management, Soil and water conservation measures; Watershed programs and models.

References:

1. Murthy, J. V. S. (1994): Watershed Management in India, Wiley Eastern Ltd., New Delhi
2. Mutreja, K. N. (1990): Applied Hydrology, Tata McGraw-Hill Pub. Co. Ltd., New Delhi
3. Heathcote, I. W. (2009): Integrated Watershed Management: Principles and Practice, John Wiley and Sons, New York
4. Cech, T. V. (2003): Principles of Water Resources: History, Development, Management, and Policy, John Wiley and Sons, New York
5. Brooks, K. N., Folliott, P. F. and Magner, J. A. (2012): Hydrology and the Management of Watersheds, Wiley-Blackwell, Oxford

WATERSHED MANAGEMENT (Special Paper Practical)
Paper Code GEDM:1002C (6)

Credit: 05 **No. of Periods: 90**
Marks: 100

Unit I: Mapping and demarcation of watershed using DEM: drainage; Morphometric analysis of Watershed- Measurement of area, perimeter, Linear- stream ordering, drainage number (Nu), streams length (Lu), bifurcation ration (Rb); areal – area (A), perimeter (P)drainage density (Dd), stream frequency (Fs), Texture ratio (Rt), Basin length (Lb), Elongation ratio (Re), Circulatory ratio (Rc), Form Factor ratio (Rf), Constant of channel maintenance (C); Relief – Maximum and minimum elevation, Basin relief, Ratio.

Unit II: Water balance estimation: Precipitation, Rainfall intensity, Rainfall variability, Potential Evapotranspiration, Actual Evaporation, Water surplus, Water deficit, Moisture index, Aridity index, Climatic classification (Thornthwaite); Ground water recharge model (SWAP).

Unit III: Water quality: Physical and Chemical parameters; NDWI & MNDWI; SWAT model.

Unit IV: Land capability classification: Slope, Landforms, LULC, Soils, Crop combination.

Laboratory Notebook and Viva-voce.

References:

1. Monkhouse F.J and Wilkinson HR (1952) Maps and Diagrams, their compilations and concentration, Muthuen & Co. London.
2. Harwel JD, and Newson MD. (1973)- Techniques in Physical Geography, Mc. Millan Edu. Ltd. London.
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DISSERTATION
Paper Code GEDM:1003C (6)

Credit: 06
Marks: 100

4th Semester M.A/M.Sc in Geography and Disaster Management students should select a specific topic for dissertation with the consultation of the allotted supervisor. The dissertation should be under the following heads:

A. Title of the project
B. Introduction
C. Statement of problem
D. Review of Literature
E. Study Area
F. Objectives
G. Research Methodology
H. Results & Discussion
I. Conclusion
J. References
K. Field Photos

Evaluation Scheme:

A. Statement of problem - 02 Marks
B. Review of Literature - 05 Marks
C. Study Area with location map - 05 marks
D. Objectives - 03 Marks
E. Research Methodology - 05 Marks
F. Results and Discussion - 10 Marks
G. Conclusion - 05 Marks
H. References - 03 marks
I. Field Photos - 02 marks
J. Presentation - 15 Marks
K. Viva Voce - 15 Marks

INDUSTRIAL GEOGRAPHY
Paper Code GEDM:1004E

Credit: 04 **No. of Periods: 72**
Marks: 100

Unit I: Classification of Industries: Nature and Scope of Industrial Geography; Manufacturing and Industry; National Industrial Classification System; Industrial Regions of India: Evolution, attributes.

Unit II: Industrial Theories: Industrial Theories of Weber, Losch, Pelender, Marx with critical reviews and Present-day Relevance; Industrial Models with Evolution, attributes, Relevance: PPP, PSU, Co-operatives, FDI.

Unit III: Industrial Policy of India: Industrial Policy during Pre-Plan period, Plan Period, Post LPG Period; Concept, History and Evolution of SEZ and related Issues; Industrial Corridor-Territorial Production Complex, IT Parks; Industrial Labour Class and Labour Law

Unit IV: Contemporary Industrial Issues: Impact of Globalisation on Indian Industry; Industrial Production Chain: Natural Resource, Labour, Capital; Industrial Supply Chain: Market, Transport; Environmental Pollution, Clean Technology, Concept of Polluters Pay, Location and Re-location of Polluting Industry, Carbon Trading; Project Work on Industrial Contemporary Scenario in Indian.

References:

1. Abbott, L. F. (2010). Theories of the Labour Market and Employment: A Review. United Kingdom: Industrial Systems Research.
2. Abbott, L. F. (2013). Theories of Industrial Modernization and Development: A Review. United Kingdom: Industrial Systems Research.
3. Chatterjee, A. (2012). Industrial Policy and Economic Development in India: 1947-2012. India: New Century Publications.
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CULTURAL AND HISTORICAL GEOGRAPHY
Paper Code GEDM:1005E

Credit: 04 **No. of Periods: 72**
Marks: 100

Group A: Cultural Geography

Unit I: Nature and concept of Cultural Geography: Carl Sauer and the Cultural Theory, the morphology of cultural landscape; Concepts: cultural hearth, cultural area, cultural landscape, cultural ecology, cultural diffusion, cultural realm.

Unit II: Globalisation of Cultures: cultural politics, socio-cultural transformation, de-territorialisation of spaces and cultures, role of global capital and media in hybridisation of the World.

Group B: Historical Geography

Unit III: Nature, evolution and scope of historical geography and its relation with other disciplines; Source of evidence and data in historical geography; historical geography of India.

Unit IV: Evolution of the cultural landscape of India from pre- historic times to the present; Territorial organisation of the Janapadas in ancient India, resources, environment, settlements, economy and trade routes; regions, economy, settlement patterns, forest, trade routes, territorial political divisions in the medieval period; coastal and interior centres, resource use, settlements, transportation and their effects during colonial economy.

References

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25. Subba Rao, B. 1958. *Personality of India*, MS University Press, Baroda.
26. Tamaskar, B.G., 1985. *Contributions to Historical Geography of India*, Inter-India Publications, New Delhi.

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